IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

NICE SYSTEMS, INC. and NICE SYSTEMS, LTD.,	)	
Plaintiffs,	)	
v.	)	Civil Action No. 06-311-JJF
WITNESS SYSTEMS, INC,	)	
Defendant.	)	

PLAINTIFFS' RESPONSE TO DEFENDANT WITNESS SYSTEMS, INC.'S OPENING CLAIM CONSTRUCTION BRIEF

YOUNG CONAWAY STARGATT & TAYLOR, LLP

Melanie K. Sharp (No. 2501)
Karen E. Keller (No. 4489)
Mary F. Dugan (No. 4704)
The Brandywine Building
1000 West Street, 17th Floor
Wilmington, DE 19801

P.O. Box 391
Wilmington, DE 19899
(302) 571-6681
msharp@ycst.com

KAYE SCHOLER LLP

Scott G. Lindvall
Joseph M. Drayton
425 Park Avenue
New York, NY 10022
(212)836-8000

Attorneys for Plaintiffs NICE Systems, Inc. and NICE Systems, Ltd.

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Plaintiffs NICE Systems, Inc. and NICE Systems, Ltd. (collectively "NICE") hereby submit their response to the opening claim construction brief of defendant Witness Systems, Inc. ("Witness").

I. The `570, `345 and `370 Patents[1]

A. "Telephony Events" (`570 patent: claims 6, 7; `345 patent: claims 14, 40; `370 patent: claims 1, 27)

As set forth in NICE's opening brief, Witness' proposed construction for the term "telephony event" is identical to NICE's construction except for the last part which states "***and are not identifying numbers. Agent-entered information is not data regarding telephone events***." (NICE's Opening Claim Construction Br. ("NB") at 27). The differences in the parties' constructions arise due to an attempt by Witness to (1) improperly include, within its construction, one of the many things that a "telephony event" cannot be and (2) improperly limit the meaning of "data regarding telephony event" -- a claim phrase the parties did not identify as in need of construction.

In an attempt to support its overly complex construction of the term "telephony event," Witness relies solely on the prosecution histories of the `345 and `370 patents. (Witness's Opening Claim Construction Br. ("WB") at 8-9) The statements relied on by Witness during the prosecution of each patent were made in reference to the "Peavey"

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[1] In its opening brief, Witness intentionally mischaracterized the `570, `345 and `370 patents as the "Single-Object Database Patents" in an attempt to create support for its claim construction of disputed claim terms in these patents. The phrases "single-object" and "single-object database" are not used in the claims and specifications of those patents and should not be interpreted by the Court as having any relevance to the construction of terms in the claims of the `570, `345 and `370 patents. Additionally, NICE relies on its positions and arguments set for its opening brief with regard to the claim terms and phrases "telephone call," "telephone call segment," "segment," "call record," "data representation" and "data representations of lifetimes of telephone calls."

reference. None of the statements, however, represent the required clear and unmistakable disavowal of claim scope.

Consistent with the statements made by the patentee during the prosecution of the `345 patent (Joint Claim Construction Chart, ("JCC") Ex. 9), there is no dispute that a telephone number by itself is not a "telephony event." A telephone number, however, may be "data regarding a telephony event," and may, in combination with other data, represent a telephony event. However, Witness seeks to construe "telephony events" as not including "identifying numbers." This, of course, begs the question: What are "identifying numbers"? Surely, such a construction with that language will not be useful to a jury.

In support of its proposed language "Agent-entered information is not data regarding telephone events," Witness quotes a single statement from the prosecution history out of context – "None of the agent entered information is telephony event data, since a telephony event is an action or occurrence, captured by a computer, relating to a telephone call." (WB at 9). This statement does not mean that all agent information is not telephony event data. Instead, the inventors merely informed the PTO that the "agent entered information" disclosed in the Peavey reference was not telephony event data because Peavey did not disclose a system that uses a computer to capture an action or occurrence relating to a telephone call, *i.e.*, telephony events, as required by the inventions of the '370 patent. (JCC, Ex. 14 at 4; *see also* Ex. 9). Such a statement in no way supports Witness' construction of the term "telephony event" which precludes agent entered information from being "data regarding a telephony event" in a method or

system, like the claimed invention, that uses a computer to capture an action or occurrence relating to a telephone call.

B. "Data Representation of a Lifetime of the Telephone Call" (`570 patent: claims 6, 7)

NICE demonstrated that the plain meaning and the specification show that the term "data representation of a lifetime of the telephone call" should be construed to mean "data (*e.g.*, voice information and/or metadata) representing an entire telephone call." (NB at 29-30). Witness' very complex and confusing construction, on the other hand, impermissibly seeks to import the preferred embodiment's management of recording in a "call-centric (rather than event-centric) fashion" into the claims. (Id.). Indeed, Witness' only support in the specification for its construction comes not from the abstract, background of the invention or the summary of the invention of the `570 patent, but rather from excerpts of the description of the preferred embodiment's call record and master call record. (WB at 10-12). As such, Witness' proposed construction should be rejected by the Court.

C. "Constructing a Data Representation of a Lifetime of the Telephone Call Using Data Regarding Telephony Events Associated with the Telephone Call Segments of the Telephone Call" (`570 patent: claims 6, 7)

Witness proposes a construction for this claim phrase that improperly limits its scope by precluding the use of whatever is identified by the ambiguous phrase "an identifier or key" to form a data representation of a lifetime of a telephone call. (WB at 13-14). Witness interprets statements made by the patentee during the prosecution of the `345 patent as disclaiming the use of an "identifier or key" to construct a data representation of a lifetime of a telephone call. (Id.). The patentee made no such statements. (JCC, Ex. 9). To the contrary, in discussing the difference between its

invention and the "Peavey reference," the patentee acknowledged that Peavey used a "telephone number and the trunk the telephone call originated from" which is "telephony related data." (Id. at 10). Despite the Peavey reference's use of certain telephony data to "associate the recording of a call with the customer data record," the patentee distinguished its invention over Peavey for several reasons. One distinction was the fact that Peavey did not disclose a method or system requiring the use of a computer to capture an action or occurrence relating to a telephone call, *i.e.*, telephony events. Another distinction was that the two pieces of telephony data used by its system, in combination or alone, could not represent a telephony event. (Id. at 10-11). In light of these distinctions, the system described by Peavey did not store "data regarding telephony events." Contrary to Witness' assertion, the patentee's statements regarding the Peavey reference are not a "clear and unmistakable" disavowal that "an identifier or key" is not "data regarding telephony events" in systems that monitor telephony events.

D. "Wherein said Data Representations are Constructed Using Data Regarding Telephony Events Associated With Telephone Call Segments" (`345 patent: claim 14)[2]

Like Witness' construction of the claim phrase "constructing a data representation of a lifetime of the telephone call using data regarding telephony events associated with the telephone call segments of the telephone call," Witness' only support for its proposed construction is the erroneous assertion that patentee, during the prosecution of the `345 patent, disavowed an "identifier or key" from being data regarding a telephony event. (WB at 13-14). As demonstrated above, the statements relied on by Witness do not

[2] The phrase "wherein each data representation of a telephone call is constructed using data regarding telephony events associated with telephone call segments of the telephone call" in claim 40 of the `345 patent is also in dispute. For the reasons set forth in this section, this claim phrase does not need construction.

represent such a disavowal, and Witness has no other support for its proposed construction.

E. "Master Call Record" (`370 Patent, claims 1, 27)

NICE demonstrated that the plain meaning and the specification show that the term "master call record" should be construed to mean "a record containing information about the location of all telephone call segments of an entire telephone call." (NB at 35-36). Just like its construction of the claim phrase "data representation of a lifetime of the telephone call," Witness' proposed construction of "master call record" relies solely on the patentee's description of the preferred embodiment of the terms "call record" and "master call record." The issue before the Court remains whether the master call record must be a "call-centric data record." The plain claim language of the `370 patent does not require a master call record be "call-centric." Only the preferred embodiment, rather, is a call-centric system. (col. 8:14-19; col. 32:51-57).

F. "Matching a Received Telephony Event with a Constructed Call Record" (`370 Patent, claim 1)

Witness' confusing construction of the claim phrase "matching a received telephony event with a constructed call record" is an improper attempt to have the Court restrict claim 1 of the `370 patent to one method of matching a telephony event to a call record set forth in the specification in connection with one embodiment of the invention. In its opening brief, Witness argued that "matching" cannot be performed using a unique identifier, relying on the false premise that a telephone number cannot be data regarding a telephony event. (WB at 14-15). As set forth above, a telephone number, which may or may not be a unique identifier, can be data regarding a telephony event. Thus, there is no

basis to construe the term "matching" as limited to the way the preferred embodiment matches a telephony event with a call record.

Witness also asserts that the prosecution history requires that "matching . . . requires some calculation." (WB at 15). In direct contravention to its position, Witness admits that the statement it relies on in the prosecution history was made by the patentee to distinguish a dependent claim which required the use of a confidence factor algorithm to perform the claimed "matching" over the Peavey reference. (WB at 14-15). It is well settled that an independent claim should be construed to be broader than its dependent claim. Therefore, Witness' reliance on a statement made regarding a dependent claim cannot be used to limit the construction of the independent claim which is broader in scope.[3]

G. "Combining the Updated Call Record With Data Indicating the Location of Recorded Audio Data for the Segment of the Call" (claim 1)

Witness asserts that its ambiguous construction[4] of this claim phrase will make clear to the jury that a call record cannot contain the location of recorded audio. This position is inconsistent with both parties' proposed constructions of the claim term "call record" which recognize that a "call record" may contain data regarding the location of recorded audio.

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[3] Witness' construction of the claim phrase "matching said one or more received telephony events with said call record" in claim 27 of the `370 patent is the same as its proposed construction of the claim phrase "matching a received telephony event with a constructed call record" in claim 1 of the `370 patent. For the same reasons expressed above, the Court should also reject Witness' construction of the claim phrase "matching said one or more received telephony events with said call record."

[4] Witness' proposed construction on its face is confusing and essentially meaningless.

Witness further asserts that a master call record is obtained by adding "location data" to an "updated call record." (WB at 15). This position is inconsistent with the teachings of the `370 patent. For example, claim 2 recites that the master call record can be a serial number. In that case, the "location data" of claim 1 would be ***linked*** to the updated call record as opposed to "added."[5]

II. The `371 Patent

A. "Buffer"

NICE and Witness agree that a "buffer" is used to temporarily store data. Witness now seeks to read in an additional limitation not required by the claims that "the buffer must be a structure distinct from the RAS device." (WB at 16). Witness ignores, however, that the RAS device can be "partitioned" to perform different functions (*See* Fig. 2 and col. 2:55 - col. 3:17). Nothing in the claims prohibits the RAS device from serving to temporarily store information as a buffer (*e.g.*, virtual memory) and also to store information so that it can be accessed for the playback of the data in accordance with the patent. Thus, in accordance with the claim, data can be "buffered" in a portion of the RAS device and transferred to another portion of the RAS device.

B. "Digital Audio Tape"

Witness attempts to narrowly define digital audio tape ("DAT") contrary to the way in which one skilled in the art would have understood the term when the `371 Patent

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[5] Witness' construction of the claim phrase "combining said updated call record with data indicating one or more locations of recorded audio data for two or more segments of the call" in claim 27 of the `370 patent is substantially the same as its proposed construction of the claim phrase "combining the updated call record with data indicating the location of recorded audio data for the segment of the call" in claim 1 of the `370 patent. For the same reasons expressed above, the Court should also reject Witness' construction of the claim phrase "combining said updated call record with data indicating one or more locations of recorded audio data for two or more segments of the call."

was filed on December 21, 1993. No one skilled in the art would have understood DAT to be a media limited to storing only audio data per Witness' construction. To the contrary, DAT was understood as being capable of storing non-audio computer data, such as "time data," as explained in the contemporaneously-filed `005 patent-in-suit (col. 3:65).[6] Witness improperly seeks to limit DAT to a medium that could ***only*** store audio data and nothing else when one skilled in the art would know that in 1993, DAT was used to store computer data in general, not just audio data.[7]

C. "Writing the Audio Data from the Buffer onto a Digital Audio Tape and a Random Access Storage Device"

Witness' proposed construction attempts to read into the claims non-existent limitations and demonstrates a fundamental misunderstanding of the claimed invention. The claim language simply requires that audio data is transferred from a buffer to both a RAS device and to a DAT without any requirement that the transfer be either "simultaneous" or "direct." A key technical aspect of the `371 Patent is the ability to playback audio data from a RAS device without interfering with the transfer of audio data to DAT. This is achieved in accordance with the plain language of the claim so that audio data is transferred to both a DAT and to a RAS device without regard to whether the transfer is "simultaneous" and without regard to whether there are intervening steps used in addition to those recited in the claim. Thus, the claim is "open" to the inclusion

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6 The `371 Patent's inventor, Mr. Henits, is also named as an inventor on the `005 Patent. Mr. Henits is also the named inventor on Dictaphone U.S. Patent 5,339,203 filed on the same date as the `371 Patent. (Ex. A). The `203 patent is directed to creating "bit map" tables on DAT (*see* Abstract), demonstrating that DAT was understood to mean a media that recorded more than audio data.

7 Witness improperly relies on a 1997 dictionary definition (four years *after* the `371 application was filed) which refers to a specific product developed by Sony. (WB at 18). Even this definition does not exclude the recording of non-audio data on DAT.

of additional steps between a buffer and either a RAS device or between a buffer and a DAT so long as audio data is transferred from a buffer to a RAS device and to a DAT.

Witness' argument that "Claim 1's next step - 'retrieving audio from the random access storage device while audio data is written into the digital audio tape and the random access storage device' - confirms the simultaneity requirement" makes absolutely no sense. (WB at 19). This language simply means that one using the claimed system can retrieve audio data from the RAS device while audio data is written to a DAT and the RAS device. The cited language imposes no requirement of "simultaneity."

D. "Pair of Pointers"; "The First of said Pointers Operative for Transmitting Audio Data to said Random Access Storage Device from said Buffer and the Second of said Pointers Being Operative to Send Audio Data from said Random Access Storage Device to said Controller."

NICE in its opening brief fully explained that – as the claim language and the specification make clear – the "reading" of data from the RAS device (e.g., in playing back stored audio) is independent from the "writing" of data to the RAS device. (NB at 8-10) (*e.g.*, "[t]he request for the retrieving of data has no affect [sic] on the pointer 30 which continues to transmit data to the RAS device" (col. 4:13-15)). Again, Witness fails to comprehend the basic operation of the claimed invention. At any time, there may or not be incoming calls to be logged. Similarly, during any period of time a user of the claimed invention may or may not decide to retrieve audio data stored on a RAS device. While the claimed invention is ***capable*** of permitting a user to retrieve stored audio data while new audio data is transferred to the RAS device, there is no basis for requiring that the two independent functions operate "simultaneously."

Witness also seeks to construe this claim language divorced from the specification and common sense by attempting to require that the controller is the actual destination of

audio data retrieved from the RAS device. The specification is quite clear that in retrieving audio data:

> "A second pointer 34 is also in communication with the RAS device 23 and is ***under the control of the controller*** 20 in response to input from the supervisor 21 as will be explained hereinafter."
>
> * * *
>
> "The supervisor 21 can communicate with the controller 20 for the purpose of obtaining data from the RAS device 23. Upon input of the time and date of the data to be retrieved, the controller will locate the pointer 34 at the appropriate location [on the RAS device]. . . The pointer 34 will go to such location ***so the data can be played back through the speaker 17***."

(col. 2:51-54; col. 4:1-13) (emphasis added). The specification makes plain that the controller directs the retrieval of the desired audio data -- it is ***not*** the destination of the audio data. To the contrary, the specification makes plain that the retrieved audio data is sent "under the control of the controller" to an output (like a speaker 17) so that a person can hear the audio.

III. The `738 Patent

A. "Audio Processor"

Witness makes essentially two arguments in support of its construction. Neither has any merit. First, Witness is wrong that NICE's construction does not assist the jury in understanding what an audio processor "is". NICE's construction explains exactly what the audio processor "is:" a processor that processes audio signals. Witness' construction, in contrast, fails to address what the audio processor is (other than to say a "device") and instead is based on reading highly technical and confusing limitations from the examples in the specification as to the signals received by an audio processor. (WB at 24). The "Summary of the Invention" explains that the audio processor (called the "signal processor") is "sen[t] digital data." (col. 1:44-49). The "Summary of the

Invention" makes no mention of the "impedance balanced" or "optimized signal" that Witness attempts to read into the claim. Witness' use of a specific embodiment to limit the plain claim language is, therefore, improper.

Second, Witness is wrong that NICE's construction renders the term "interface" superfluous. (WB at 24). The language of the claim specifies the role of the "interface" in the voice processing system: the "interface" "ha[s] a plurality of ports that provide communication with communication lines" and is "in communication with [the] audio processor." (`738 patent, Claim 1). In other words, the claims specify that the "interface" provides a communication path between the "audio processor" and the "communication lines" (such as a telephone line). NICE's construction does not eliminate this interface.

B. "Digital Signal Processor" & "Application Processor"

NICE demonstrated that the plain meaning and the specification show that the term "digital signal processor" ("DSP") should be construed to mean a specialized processor that processes digital data and that the term "application processor" should be construed to mean a processor that processes applications. (NB at 41-43). Witness erroneously argues NICE's construction does not distinguish between the application processor and the DSP. (WB at 25).

On the contrary, NICE's construction makes clear that one processor – the DSP – processes digital signals. Other language in the claims makes clear that the DSP is "in communication with" a "time division multiplexer chip." (`738 patent, claim 1). NICE's construction makes clear that the application processor processes applications. Other language in the claims makes clear that an "application processor" is "in communication" with different components of the system than those with which the DSP communicates:

The application processor is in "communication with" a "bus" by which the application processor can communicate with the host processor of the system. (Id.). As a result, NICE's construction, particularly when applied in combination with other language in the claims, makes clear that the application processor and the DSP are two separate components.

IV. The `005 Patent

A. "Circuit Modules . . . for Converting" & "A Circuit . . . for Compressing"

NICE demonstrated that the "circuit module . . . for converting" and "a circuit . . . for compressing" are structural elements and not means-plus-function elements. (NB at 44–47). Witness erroneously argues that NICE's constructions "blur the lines between different elements" "because it abstracts these specific circuits into a generic 'assembly of electronic components.'" (WB at 27-28).

On the contrary, NICE's construction makes clear the distinction between the two circuits. The term "circuit" communicates structure – that is, an assembly of electrical components – to a person skilled in the art. (*See, e.g.*, NB at 45). But, that is not the end of NICE's construction. The "circuit modules . . . for converting" is an assembly of electronic components ***that converts analog voice signals to digital voice signals***. Other language in the claim makes clear that the converting circuit includes "at least two terminals" and is connected to a "bus" to communicate with the compression circuit. (`005 patent, Claim 1). In contrast, the "circuit . . . for compressing" is an assembly of electrical components ***that compresses digital voice signals.*** Other language in the claim makes clear that the compressing circuit is connected to some different components in the

digital recording logger than those to which the converting circuit is connected: the compressing circuit is connected to a multiplexer circuit. (Id.).

B. "Analog Voice Signals"

NICE demonstrated that construing "analog voice signals" as an electrical wave used to convey voice information provides an understandable explanation of the technical claim term. (NB at 46). Witness proposes "plain language" as its construction and incorrectly argues that NICE's construction takes an "easily understood distinction" between analog and digital voice signals and renders that distinction ambiguous. (WB at 28). However, Witness' own argument shows that its proposed construction using "plain language" is flawed. Witness asserts that "not every juror maybe able to articulate the precise differences between analog and digital voice signals" while at the same time leaving those terms without construction as "plain language" without specifying what that plain language is. (Id.). In other words, Witness admits that its "plain language" construction leaves the juror without a basis for distinguishing between analog and digital voice signals.

On the other hand, NICE provides a definition of the technical term "analog voice signal" that enables the jurors to understand that term. NICE's construction eliminates the ambiguity between analog voice signals and digital voice signals that would be created by the "plain language" construction proposed by Witness.

C. "Digital Audio Tape (DAT)"

In its discussion of `371 patent above, NICE addressed Witness' construction of this claim term. (*See* above at 7.)[8]

V. The `372 Patent

A. "Telecommunications ('Telecom') Stage"

NICE demonstrated that the meaning of telecom stage, based on the patent specification, is the stage that serves to capture and pre-process signals from two or more communication channels and interfaces with the recorder. (NB at 17-18). Witness incorrectly asserts that the patent specification and prosecution history require a limitation that the telecom stage receives input from a communication channel by "'passive' methods of recording." (WB at 30-31).

With respect to the `372 patent specification, Witness without basis relies on a single use of the word "passive" in the description of an example of the invention. (WB at 31). That example applied only to the use of a telecom stage to capture signals from "telephone lines," and did not include the other examples in the specification where the telecom stage captures signals from "dedicated communication lines, or other input data sources." (col. 7:52-55). The specification further states that "the telecom stage 102 incorporates a first interface 110 for receiving signals from the input lines," (col. 7:60-63), and that:

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[8] With regard to the `005 patent, Witness also incorrectly asserts that the `005 patent "touts" advantages of a DAT over other storage media, relying on specification's statement that "[b]ecause DAT recording is relatively fast compared to channel data rates *i.e.*, the DATs are capable of receiving data faster than data is digitized by the system . . . ." (col. 3:34-59) (WB at 29). This statement is irrelevant; it does not compare DAT to other storage media as Witness argues, but rather compare the speed that a DAT records data with the speed that the system digitizes data.

> ***When used with telephone lines***, interface 110 ***generally*** is a high impedance interface that allows for ***passive*** tapping of the phone lines. (col. 7:65-67) (emphasis added).

This single use of "passive" with respect to a single example limited to "telephone lines" that "generally" allows for passive tapping does not justify reading the word "passively" into the claims.

With respect to the prosecution history, Witness incorrectly relies on NICE's response to a rejection by the examiner over a 1993 Knitl patent that stated:

> "Knitl teaches a multi-stage data logging system comprising: a) a telecommunications ('telecom) stage *(Fig. 1, Private Branch Exchange)* receiving input from a plurality of input channels." (Ex. B at 3) (emphasis added).

In other words, the Examiner reasoned that the Private Branch Exchange ("PBX") was the "telecom stage."

In response, NICE explained that Knitl does not disclose a data logging system and that the Knitl PBX was not the telecom stage of the claimed invention. NICE explained that "the data logging systems subject of this application monitor information transmitted on communication channels, but are not part of the communication system and thus do not affect the transfer of information." (Ex. B at 3; JCC Ex. 11 at 9).

NICE explained that in particular the PBX is not the telecom stage because the telecom stage of the invention "monitors" established communication channels and may be "connect [ed] to – but not part of – the PBX":

> "In particular, contrary to the assertion in the Office Action, the Private Branch Exchange (PBX) cannot be a telecom stage of a data logging system at least because the PBX switch forms part of the communication system, while ***the telecom stage*** of this application ***monitors signals on established communication channels***. In fact, the written description at page 3, lines 17-33, specifically mentions problems associated with ***connecting*** a logging system to a PBX switch, the clear inference being

that ***a PBX switch is not part of the logging system.***" (JCC Ex. 11 at 10) (emphasis added).

The prosecution history does not describe the "passive" recording that Witness attempts to read into the claims. Instead, the above distinction of Knitl is consistent with the language in the claims specifying a telecom stage "receiving input from a plurality of communication channels." (*See, e.g.*, claim 1.) The fact that the claims require that the telecom stage "receives" input from communication channels already makes clear that the communication channels (*e.g.*, including a PBX) themselves are not part of the telecom stage: if the telecom stage included the communication channels, as it would not need to receive signals from the communication channels, the telecom stage would already have the signals.

B. "Wherein at Least Two Stages of the System Are Physically Separable and in Operation Can Be Located Wide Distances Apart"

Witness ignores the plain claim language and incorrectly asserts that the prosecution history disclaimed that the telecom stage and the recorder stage can be in a single unit (*e.g.*, "in the same box"), and, therefore, incorrectly interpret the claims to require that the telecom stage and the recorder stage ***must be*** physically separable from each other. (WB at 31-32).

Witness admits that "the specification describes other examples outside Witness' construction," but then incorrectly relies on NICE's distinction of a reference describing a prior logger called the DSN 1000 and argues that NICE "disclaimed the use of a combination telecom/recorder stage." (WB at 32). NICE made no such disclaimer. In its response to the examiner's anticipation rejection, NICE stated that the logger claimed in the application "required three distinct stages" and that "at least two of the stages" "must be physically separable." (JCC Ex. 12 at 3). NICE asserted that the DSN 1000 is

a "single unit performing ***all logger functions***," and thus, it did not anticipate the application claims because there was "no disclosure teaching, or even suggestion in the [DSN 1000] reference that it may be desirable to have different functional stages that are physically separable and in operation are capable of being located wide distances apart." (Id.) In other words, NICE told that examiner that the DSN 1000 did not teach that ***any*** of the three stages – telecom, recorder or distribution – could be separable from the other stages of the logger. NICE never disclaimed a combination telecom/recorder as argued by Witness.

C. "Web Server"

NICE demonstrated that the plain meaning and the patent specification show that the meaning of "Web server" is a component that provides access to information accessible from a computer connected to the Internet or an intranet. (NB at 20). Witness incorrectly argues that the patent's use of a capitalized "W" means that NICE intended a gateway server between an internal network and the World Wide Web ("WWW"). (WB at 32-33).

The `372 patent specification, however, in explaining the embodiment illustrated in Figure 6, states that "the Web server 280 acts as an intermediary between one or more recorders 252 in the recorder stage of the logger, and the users accessing the stored information via, ***for example***, the Internet." (col. 12:17-19) (emphasis added). Figure 6 shows the Web server connected to an item named "Network" (260). Figure 5 also shows users (computers) accessing recorded information over a wide area network (WAN), the internet or an intranet. In other words, the specification shows that the Web server is between the "recorder stage of the logger" and a "network." Nowhere in the

specification is the term Web server used as an intermediary between an internal network and the WWW as argued by Witness.

Most telling, the claims of the patent make clear that a "Web server" as used in the patent does not require transmission over the internet or World Wide Web. Claim 43 recites a logger that includes a "server" that can "transfer[] logged data" over a "communications network" to a "user." Claim 44 depends from claim 43 and limits the server to a "Web Server" **and** limits the "communications network" to the "Internet." If the term Web server means data is transferred over the WWW, as asserted by Witness, then the claim 44 language reciting that the "communications network is the Internet" would be rendered superfluous. As a result, Witness' proposed construction is simply wrong.

Finally, Witness relies on NICE's statement during the prosecution that the prior art did not teach accessing stored logger information "where users communicate requests for stored data over a 'Web' in the sense of a communications network ***like the*** Internet." (WB at 32-33). Rather than support Witness' construction, this statement undercuts it. The statement says that "a" "Web" is a "communications network," and gives an example ("like") of the Internet. The statement does not limit a Web server to an intermediary between an internal network and the Internet, but rather it implies that a Web is more generic and refers to a communications network.

VI. The `920 Patent

A. "Web Server"

The meaning of Web server as used in the `920 patent is the same as the meaning of Web server in the `372 patent. Witness recasts language from the patent specification as NICE allegedly touting its invention "by emphasizing that prior systems did not allow

Internet-access." (WB at 33). The language quoted by Witness, however, does no such thing. Instead, the specification states that "Internet ***technology*** is becoming standard" and that the prior art has taken steps to improve the reliability of multi-stage recorders. (col. 6:56-65) (emphasis added). The patent goes on to state that the prior art did not "bring[] together the most desirable features of these technologies." (Id.). The language relied on by Witness clearly does not refer to Internet-access as Witness suggests. In fact, one column later the patent explains that in one embodiment of the invention "data from the recorder stage is made available to users via a communications network such as private communications lines, corporate intranets, the Internet or any combination thereof." (col. 7:46-51). In other words, data is made available over communications networks of which the internet is one example along with private communications lines, and corporate intranets.[9]

B. "Receiving a Request for Retrieval of Stored Data," "Retrieving Stored Data," & "Transferring the Retrieved Data"

Witness incorrectly argues that the Web server itself must do all of the following: "receive" requests for stored data, "retrieve" the data and "transfer" the data. The language of the claims themselves show that the only act that must occur at the Web server is "receiving" requests for stored data. The language of claim 1, ***including the spacing, indentation and semicolons*** (which Witness omitted in its brief), is as follows:

> at a Web server having access to said at least one digital logger, receiving a request for retrieval of stored data from a client;

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[9] Witness also relies on for support of its construction a statement in the Reasons for Allowance. However, the Federal Circuit has held that statements made in an examiner's Reasons for Allowance "do not amount to a clear disavowal of claim scope by the applicant" that restricts the meaning of a claim term. *Salazar v. Procter & Gamble*, 414 F.3d 1342, 1348 (Fed. Cir. 2005).

retrieving stored data in accordance with the received request; and
transferring the retrieved data to the client.

The spacing, indentation and semicolons in the claim demonstrate that three limitations -- (i) "at a web server . . . , receiving;" (ii) retrieving; and (iii) transferring -- are a list of limitations following the word "comprising" in the claim. This means that only the "receiving a request" occurs at the Web server.

C. "Digital Logger"

NICE explained that (a) the difference between NICE's and Witness' construction is whether the logger is required to record from multiple input sources and (b) the claims themselves show that the logger includes recording from input sources, or telephone calls. (NB at 21-22). Witness argues that the language in the specification – and that appears in the claims – means that only where there is more than one logger can the multiple loggers record more than one telephone call. (WB at 35). The language of the specification (and claims) do not support Witness' argument. The specification (and claims) state: "at least one digital logger storing data associated with input from a plurality of input channels." (col. 5:1-12). Plainly, "at least one" logger includes "one" logger. This means that one logger can be "associated with input from a plurality of input channels," meaning one logger can be associated with data from multiple (a plurality) of telephone calls.

D. "Record of an Input Channel" & "Record of a Communication Channel"

NICE demonstrated that the plain meaning and the specification show that the terms "record of an input channel" and "record of a communication channel" should be construed to mean stored voice and/or call information received from an input channel

[communication channel]. (NB at 24-25). The plain meaning of the phrase "of the input channel", [or "communication channel"] is to indicate the origin of the information on the record. Witness asserts that NICE's construction renders "of an input channel" and "of a communication channel" superfluous. (WB at 36). But, Witness' argument is based on the false proposition that "all records" are from "input channels." (Id.). The claims of the `920 patent clearly differentiate between a "record of a input channel" and a "record of a communication channel." By itself, the term "record" could refer to either the record of an input channel or the record of a communication channel.

Witness' attempt to read in the phrase "identified by" an input channel [or communication channel] is contradicted by the specification. Witness argues that its proposed construction "tracks" the specification, and it quotes language that "records that correspond to different input channels appear to the user as separate files having unique record addresses." (WB at 39; col. 11:14-19). But, the next sentence of the specification explains "In a preferred embodiment, these files ***are identified by call record information*** and contain for example, information about the caller ID, the date and time of the communication, its duration and others." (col. 11:20-23) (emphasis added). Therefore, records could be identified by call information including "date and time" and "duration."

VII. The `079 Patent

A. "Event Manager" (claim 1)

Witness argues that the claim term "event manager" must be a "device," presumably eliminating the possibility that it could be in the form of software. Contrary to Witness' construction, there is nothing in the claim language, specification or prosecution file history that requires that the "event manager" be a "device" as opposed

to software. The "physical devices" described in the specification are the agent and supervisor telephonic workstations or "computers" (*See* Figure 1, items 14, 18). Figure 2 shows the "event manager" as a rectangle in a flowchart indicating it is a processing step, which indicates that it is likely software, not hardware. In fact, the specification is devoid of any discussion relating to hardware with the event manager and does not even mention the word "device."[10]

Witness also incorrectly argues that the "event manager" must "directly control" ***both*** voice logger and audio logger. Again, there is no support in the claim language, specification or prosecution file history for such a construction. First, the express language of claim 1 only requires that the event manager "determine whether . . . interactions with the computer during the telephone call meet at least one predefined monitoring condition." (col. 9:18-20). By the plain language of the claim, there is no requirement for the "event manager" to "directly control" anything. (*See also* Abstract). Most telling, claim 2, which depends from claim 1, states "wherein said event manager is able to instruct said voice logger to begin recording an audio portion…when said predefined monitoring condition is satisfied." (col. 9:21-col. 10:2). Claim 2, therefore, indicates that the "event manager" may "instruct" the voice logger (not the screen logger) to begin recording. (*See also* Claim 3). Therefore, applying the well recognized principle of claim differentiation; the "event manager" is not required to control or

---

[10] The specification notes that the monitoring system "stores captured audio and screen data to ***one or more*** storage media…."(col. 2:66-67). Contrary to Witness' implication in its brief on page 37 that the audio logger and screen logger are separate devices, this reference in the specification specifically contemplates that the screen data and audio data could be stored on one storage media, *i.e.*, one device. *See also* Figure 1, block 26 (showing a single storage media for storing both the audio and screen data). In addition, there is nothing in the specification or claims that requires the loggers to be "physical devices" as opposed to software.

instruct both (and only both as proposed by Witness) the audio logger and screen logger to record.

B. "Predefined Monitoring Condition" (claim 1)

Witness argues that the prosecution history limits the claim term "predefined monitoring condition" to exclude two specific predefined conditions. Witness, however, acknowledges that both of these predefined conditions are specifically included as examples of "predefined monitoring conditions" in the specification. (WB at 39, n.20). The Court is being asked to define only the term "predefined monitoring condition." The prosecution history relied upon by Witness does not limit the definition of "predefined monitoring conditions." The discussion in the prosecution history focuses instead on other claim language, specifically to the "during the telephone call" language in claim 1.

VIII. The `109 Patent

The invention of the `109 Patent is straight forward and elegant: it provides a specific way to record communications between two or more communication devices (whether they are IP or non-IP telephones) by conferencing in a recording device as a participant in the telephone call. Figure 1 of the `109 patent provides an exemplary illustration of the method of the invention. (col. 5:6).

Witness attempts to improperly limit the claims to the embodiment shown on Figure 3, which the specification unequivocally states only "shows an ***optional*** flow of operations."

A. "Conference Controller"/ "Through a Conference Controller"

The specification provides exemplary situations in which a conference controller can "initiate," "enable" ***or*** "establish" a conference call. (col. 5:6 - col. 6:32). By arguing that the conference controller "must enable" conference calls (WB at 41),

Witness seeks to limit the claims to a stated preference (as opposed to a requirement) in the entirely "***optional***" embodiment of Figure 3. With regard to Figure 3, the `109 specification states: "Figure 3 shows a flow diagram of an ***optional*** flow of operations according to the present invention. . . . [c]onference controller 30 enables recording device 24 to participate in the conference call, as well as ***preferably enabling*** the conference call itself." (col. 6:17-23). Even the "optional" embodiment of Figure 3 does ***not*** require that the conference controller "enable" the conference call; it is only a preference. There is simply no basis in the principles of claim construction for limiting a claim term to a preferred aspect of an optional embodiment.[11]

The same errors also infect Witness' contorted construction of "through a conference controller," to require that "data packets" (a term that does not appear in either the claims or the specification) "pass through the conference controller."

Witness' primary support for its construction is found (again) in the "optional flow of operations" represented by Figure 3. (WB at 41). Importantly, Figure 3 is directed to an ***optional*** embodiment of communications ***between two IP telephones*** (12 and 34). Witness also relies heavily on a literal interpretation of the schematic diagram of Figure 3 which, according to Witness, shows that "a conference controller sits between the two displayed callers (12 and 34)." (WB at 41). Of course, Witness completely ignores Figure 1 which shows an "exemplary implementation" of the `109 Patent invention (col. 2:61-62; col. 5:6-7).

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[11] Moreover, dependent claim 4 recites that the conference controller can "establish" a conference call. As a matter of law, a conference controller as recited in independent claim 1 cannot be required to "enable" a conference call as claim 4 shows that a conference controller has the alternative ability to "establish" a conference call.

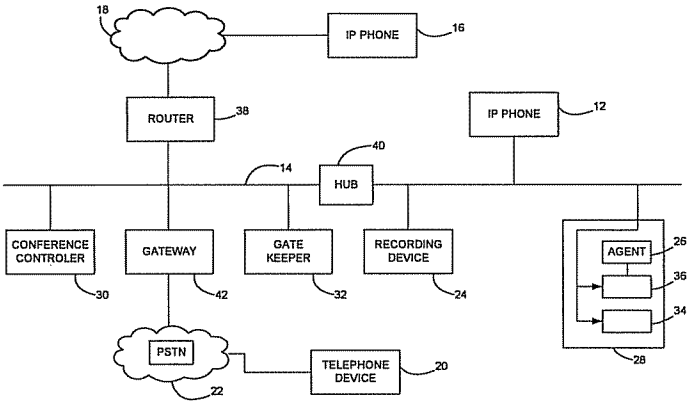

FIG.1

Figure 1 shows that the conference controller does not "sit between" any of the communication devices and that there is ***no*** flow of communication between any two communication devices that moves "through" the conference controller (whether in the form of data packets or otherwise).

Plainly the language of the claims when read in light of the specification supports NICE's construction that "through a conference controller" means "by use of a conference controller." The complete language of the limitation at issue supports this construction: "implementing the data session as a conference call through a conference controller such that said first and second communication devices are connected." (col. 7:13-16). The claim language makes clear that the conference controller serves to implement the connection of the two communication devices ***before*** there is any information flowing between them. There is no basis for requiring that information flow "through" the conference controller.

Witness' secondary support for its incorrect construction is based on a tortured reading of the prosecution history of the application (SN 111,767) leading to the issuance of the NICE's U.S. Patent 7,010,106. The statement in an April 14, 2005 Amendment

that "implementing the data session as a conference call through a conference controller was discussed ***as the basis*** for having the first and second communication devices connected as respective first and second participants" does not support Witness' construction. (JCC, Ex. 28). Witness ignores the complete history of this amendment. After an April 12, 2005 interview, the patent examiner proposed an amendment which provided "implementing the data session as a conference call ***through a conference controller*** in response to initiating the data session such that said first and second communications devices are respectively first and second participants therein ***by the conference controller***." (*See* Ex. C). Applicants noted in their April 14, 2005 Amendment that "The further proposed language of having these devices connected as participants 'by the conference controller' is believed to be superfluous and therefore is not part of the present amendment." (JCC, Ex. 28 at 9). Clearly the applicants were stating that "***through*** a conference controller" and "***by*** the conference controller" meant the same thing – that the conference controller was used to implement a conference call (*i.e.*, "by use of a conference controller"), not that "data packets" flow "through" the conference controller.

Finally, Witness makes a virtually incomprehensible argument that "data packets pass through" the conference controller by misreading a September 11, 2005 Amendment in the parent application. (WB at 43-44). Witness ignores the fact that the Rust reference discussed in the prosecution history does not have a conference controller, but uses something entirely different called a "control server." As explained in the prosecution history, the control server of Rust functions to ***store data,*** the "capture module sends data to the control server for ***storage***." (JCC, Ex. 29 at 20). This prosecution history is thus

entirely irrelevant to the construction of the "conference controller" of the `109 Patent, which does not store data.

B. "Recording Device"

"Recording device" is a term that has a plain meaning within the context of the `109 patent that a jury will readily understand: it is a device that records IP audio and/or video data. Witness seeks to improperly impose a negative requirement that a recording device "does not require an additional connection or port in the network."

Witness' sole support is an out-of-context quote from a May 10, 2006 response to an office action from the European Patent Office ("EPO"), ***after*** the '109 Patent issued on March 7, 2006 (JCC, Ex. 32) (WB at 44). In discussing two references cited by the EPO, applicants provided a number of reasons why these references were not pertinent to the pending claims. The principal distinction was that neither reference "discloses a recording device operative to join different conference calls as an additional independent participant." (JCC, Ex. 32 at WSNSDE054387). The statement relied on so heavily by Witness was made in passing (prefaced by the phrase, "It should be mentioned") that merely pointed out the deficiencies of the devices of the references (that the "implementation" of those devices would require "an additional connection or part for the recording unit/device"), without placing any limitation on the meaning of "recording device" as used in the claims pending in the EPO. (JCC, Ex. 32 at WSNSDE054373). There certainly was no "clear and unmistakable" disavowal of claim scope during prosecution of the `109 Patent.[12]

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12 Even statements made during prosecution in the U.S. do not act as a disavowal of claim scope unless the disavowal is "clear and unmistakable." *Sorensen v. ITC*, 427 F.3d 1375, 1378-1379 (Fed. Cir. 2005).

C. "Entering the Recording Device to said Conference as an Additional Participant"

Witness seeks to require a temporal limitation that the recording device is only entered after communication between the first and second communication devices has started. Such a construction is not supported by the claim language and in fact is contradicted by dependent claim 2. Claim 2 depends from claim 1 and recites "[t]he method of claim 1, wherein the step of selectively entering the recording device to said conference call includes the step of directing the recording device to enter said conference call as the additional participant ***when*** a data session has been initiated." (col. 7:27-31). Claim 2 clearly requires that that the recording device is entered as an additional participant ***at the same time*** as the data session is initiated; in other words ***at the same time*** as the first recited step of claim 1. It is black letter law that a dependent claim is narrower than the claim from which it depends. Therefore, because claim 1 must be broad enough to include entering the recording device ***at the same time*** that a data session is initiated, it cannot be construed as limited to adding the recording device only after the conference call "is already established" as Witness would have it.

D. "IP Data Session"

Witness improperly reads into the claim a non-existent requirement that the recorder receive "two distinct streams of data packets." (WB at 46). The claim language, however, only requires the recording device to receive the communication from each of the communication devices, which could be in the form of a combined stream (the usual

situation) or two separate streams.[13] The construction is confirmed by the last step of claim 1: "recording at least the portion of the IP data session received . . . ." This step does not refer to receiving "two distinct streams."

Witness again cites to the "optional flow of operations" of Figure 3 which is directed narrowly to communications between two IP telephones (col. 6:17-32). Figure 3, however, actually supports NICE's construction. Figure 3 shows separate streams from each IP phone which would be expected in a normal two-way conversation. However, most telling, is that there is only one arrow going into the recorder which represents the sum of the two streams.[14]

Finally, Witness' extrinsic evidence of another NICE published patent application with a different specification, naming different inventors does not support its construction. (JCC, Ex. 24). The language quoted from this application by Witness makes clear that not only is the application discussing "computational devices" and not "communication devices," but that the transmissions of data "include more than one type of data . . . which may also ***optionally (additionally or alternatively)*** include transmissions in the form of packets of data." (WB at 47). Plainly the quoted language (directed to an "optional" transmission of data between "computational devices") is

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13 It is well known that communications from the two participants may in fact be organized into a single stream to be received by the recording device in accordance with protocols identified in the specification. (col. 4:9-24).

14 Witness states that at page 6 of a December 19, 2004 Amendment in the parent application, NICE "explained that the recorded 'data session' was 'the data exchanged' between the call's participants." (WB at 46-47). However, no such language appears on the cited page and nothing in the prosecution history supports Witness' construction that "data packets" are transmitted or received by non-IP telephones or that an IP data session must be "two streams" of data packets.

entirely irrelevant to the construction of the term "IP data session" as used in the claims of the `109 Patent.

E. "The Portion of the IP Data Session"

The `109 patent in general, and claim 1 in particular, are directed to a method for recording a portion of an IP data session by entering a recording device as a participant to a conference call. Nothing in the claim language, the specification, or even the prosecution history, supports Witness' proposed construction which requires that "***all*** the data packets transmitted between the first and second participants" are recorded.[15] Indeed, when "data packets" are transmitted between communication devices during IP data sessions, not all of those data packets include information that is necessary for recording. The plain language of the claims require only that the recorder store the portion of the IP data session it has received – not necessarily "all" the data packets transmitted between the communication devices.[16]

The plain language of the claims makes clear that the term "the portion of the IP data session" simply refers back to the preamble of the claim which recites that the method of the claim is directed to recording a part of one or more of a plurality of IP data sessions.

CONCLUSION

For the foregoing reasons, NICE's claim construction positions should be adopted in all respects.

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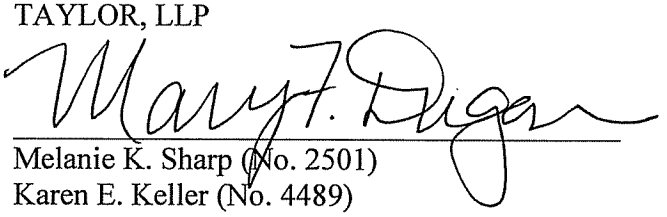
15 NICE agrees with Witness that the recited steps of the claimed method are practiced on a particular IP data session in order to record at least a "portion of [that] IP data session."

16 *See, e.g.*, Ex. D, U.S. Patent 6,122,665 (`655 patent), which is incorporated by reference in the `109 patent. (col. 4:21-24). In particular, the `665 patent describes way of filtering data packets in a communication session to record only those of interest. (col. 3:18-4:14).

Dated: June 6, 2007

YOUNG CONAWAY STARGATT & TAYLOR, LLP



Melanie K. Sharp (No. 2501)
Karen E. Keller (No. 4489)
Mary F. Dugan (No. 4704)
The Brandywine Building
1000 West Street, 17th Floor
Wilmington, DE 19801

P.O. Box 391
Wilmington, DE 19899
(302) 571-6681
msharp@ycst.com

KAYE SCHOLER LLP
Scott G. Lindvall
Joseph M. Drayton
425 Park Avenue
New York, NY 10022
(212) 836-8000

Attorneys for Plaintiffs NICE Systems, Inc. and NICE Systems, Ltd.

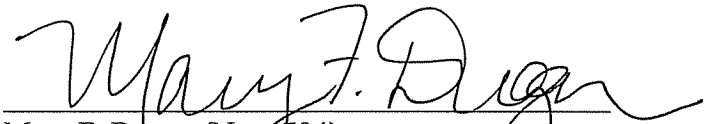
CERTIFICATE OF SERVICE

I, Mary F. Dugan, Esquire, hereby certify that on June 6, 2007, I caused to be electronically filed a true and correct copy of the foregoing document, Plaintiffs' Response to Defendant Witness Systems, Inc.'s Opening Claim Construction Brief, with the Clerk of the Court using CM/ECF, which will send notification that such filing is available for viewing and downloading to the following counsel of record:

William J. Marsden, Jr., Esquire
Kyle Wagner Compton, Esquire
Fish & Richardson, P.C.
919 North Market Street, Suite 1100
P.O. Box 1114
Wilmington, DE 19899-1114

I further certify that on June 6, 2007, I caused a copy of the foregoing document to be served by hand delivery on the above-listed counsel of record and on the following non-registered participants in the manner indicated:

BY E-MAIL
Noah C. Graubart (graubart@fr.com)
Nagendra Setty (setty@fr.com)
Daniel A. Kent (kent@fr.com)
Christopher O. Green (green@fr.com)
Fish & Richardson, P.C.
1180 Peachtree Street, NE
21st Floor
Atlanta, GA 30309



Mary F. Dugan (No. 4704)
YOUNG CONAWAY STARGATT & TAYLOR, LLP
The Brandywine Building, 17th Floor
1000 West Street
Wilmington, DE 19801

P.O. Box 391
Wilmington, Delaware 19899-0391
(302) 571-5028
mdugan@ycst.com

EXHIBIT A

US005339203A

United States Patent [19]

Henits et al.

[11] Patent Number: 5,339,203

[45] Date of Patent: Aug. 16, 1994

[54] **APPARATUS AND METHOD OF RETRIEVING A MESSAGE FROM A DIGITAL AUDIO TAPE**

[75] Inventors: **John Henits**, Bethel; **Robert B. Swick**, Stratford, both of Conn.

[73] Assignee: **Dictaphone Corporation**, Stratford, Conn.

[21] Appl. No.: **171,290**

[22] Filed: **Dec. 21, 1993**

[51] **Int. Cl.**[5] **G11B 5/19**; G11B 5/00; G11B 15/18

[52] **U.S. Cl.** **360/39**; 360/72.1; 360/32

[58] **Field of Search** 360/5, 6, 12, 32, 39, 360/48, 49, 53, 72.1, 72.2, 72.3; 379/79, 80, 93, 81; 369/53, 59

[56] **References Cited**

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Primary Examiner—Donald Hajec
Assistant Examiner—Thien Minh Le
Attorney, Agent, or Firm—Peter Vrahotes; Melvin J. Scolnick

[57] **ABSTRACT**

A scheme has been devised for retrieving audio from a digital audio tape (DAT) that has been used in a device such as a digital audio logger wherein audio is recorded on a intermittent basis. An audio bit map is created on the DAT that represents a record of activity with a "1" bit representing audio and a "0" bit representing absence of audio. The channels of the logger can be searched for a next message or previous message. A predetermined sequence of "1's" and "0's" are used in the search for identifying a message.

20 Claims, 4 Drawing Sheets

40 — CHANNEL VOICE BITS (32 31) | 38 (4 3 2 1) | 42 — TIME REPRESENTATION (SEC) START / END

32	31		4	3	2	1	START	END
0	0	- - - -	0	1	1	0	0	1.2
0	0	- - - -	1	1	1	0	1.2	2.4
0	1	- - - -	1	1	1	1	2.4	3.6
1	0	- - - -	0	0	1	1	3.6	4.8
⋮			⋮				⋮	
1	1	- - - -	1	0	1	1	n	n + 1.2
0	1	- - - -	1	0	0	1	n + 1.2	n + 2.4

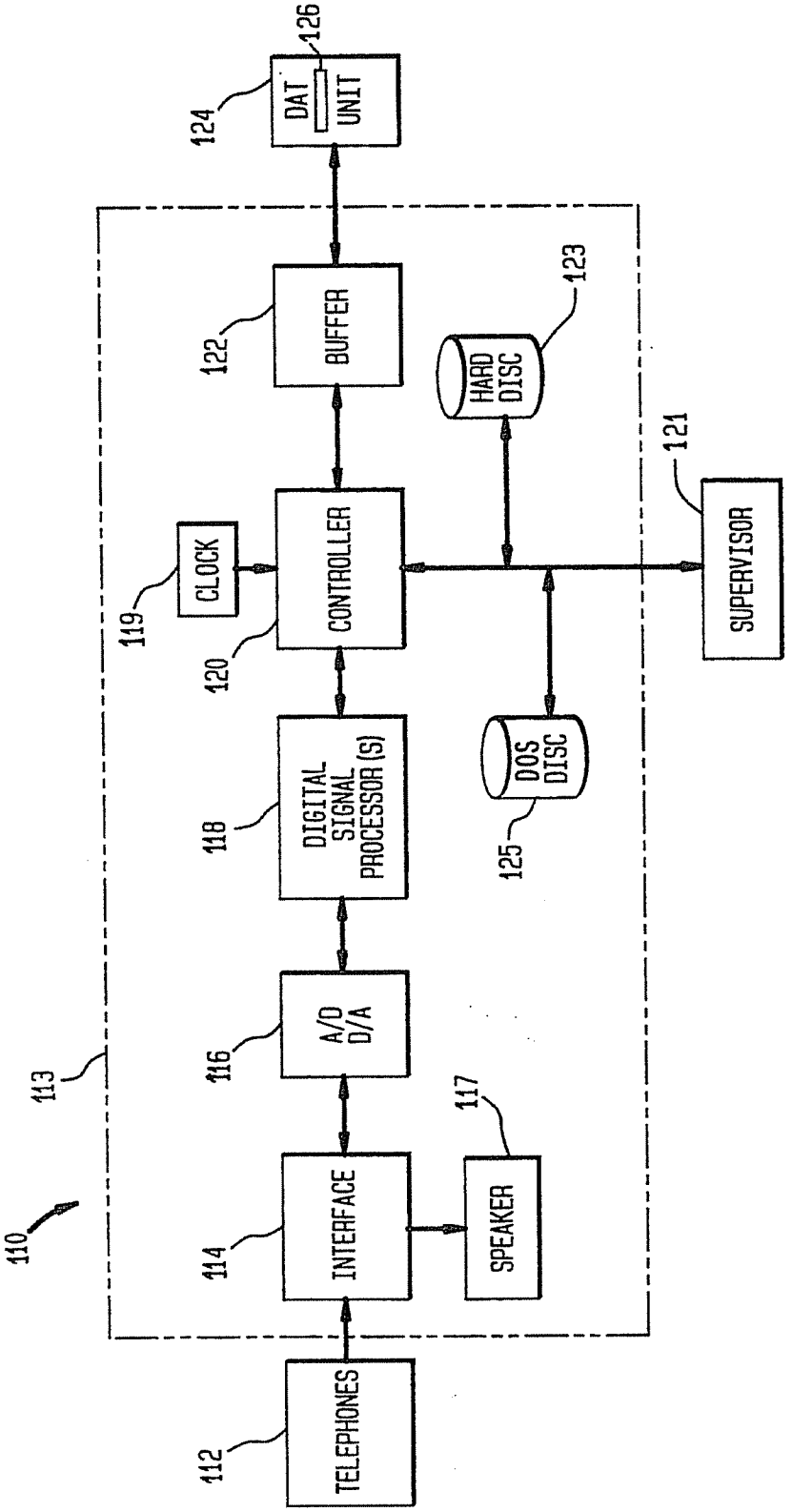

DAT UNIT
126
124
BUFFER
122
HARD DISC
123
CLOCK
119
CONTROLLER
120
SUPERVISOR
121
DIGITAL SIGNAL PROCESSOR (S)
118
DOS DISC
125
A/D D/A
116
113
117
110
INTERFACE
114
SPEAKER
TELEPHONES
112

FIG. 1

FIG. 2

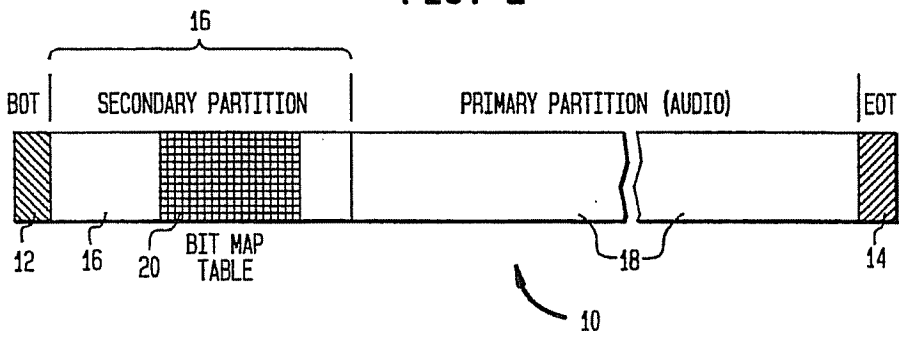


FIG. 4

32	31	CHANNEL VOICE BITS	4	3	2	1	TIME REPRESENTATION (SEC) START	END
0	0	- - - -	0	1	1	0	0	1.2
0	0	- - - -	1	1	1	0	1.2	2.4
0	1	- - - -	1	1	1	1	2.4	3.6
1	0	- - - -	0	0	1	1	3.6	4.8
⋮							⋮	
1	1	- - - -	1	0	1	1	n	n + 1.2
0	1	- - - -	1	0	0	1	n + 1.2	n + 2.4

FIG. 5

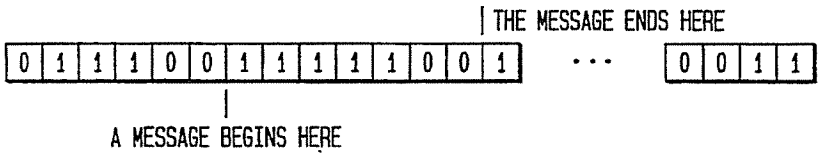


FIG. 3

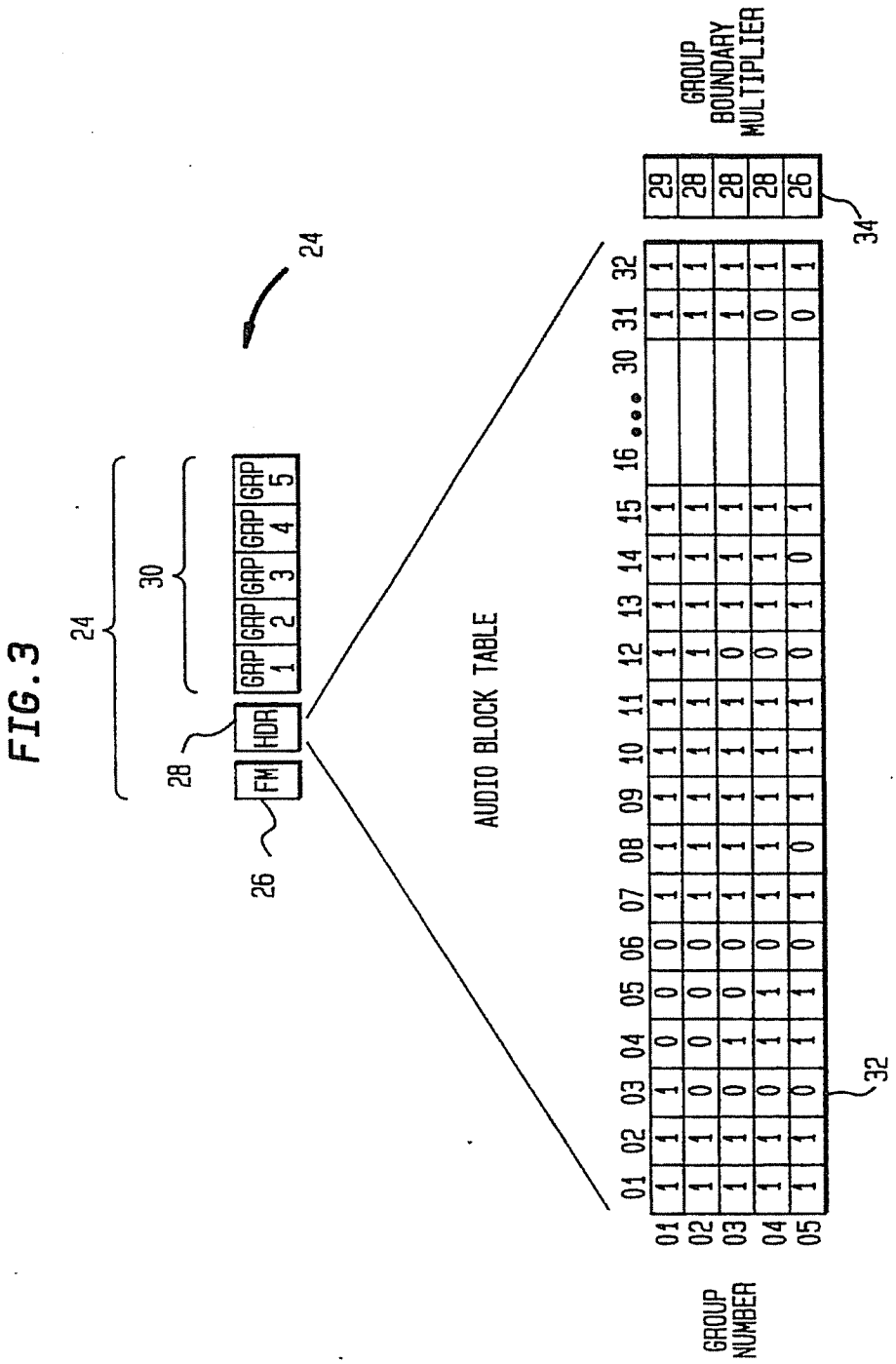
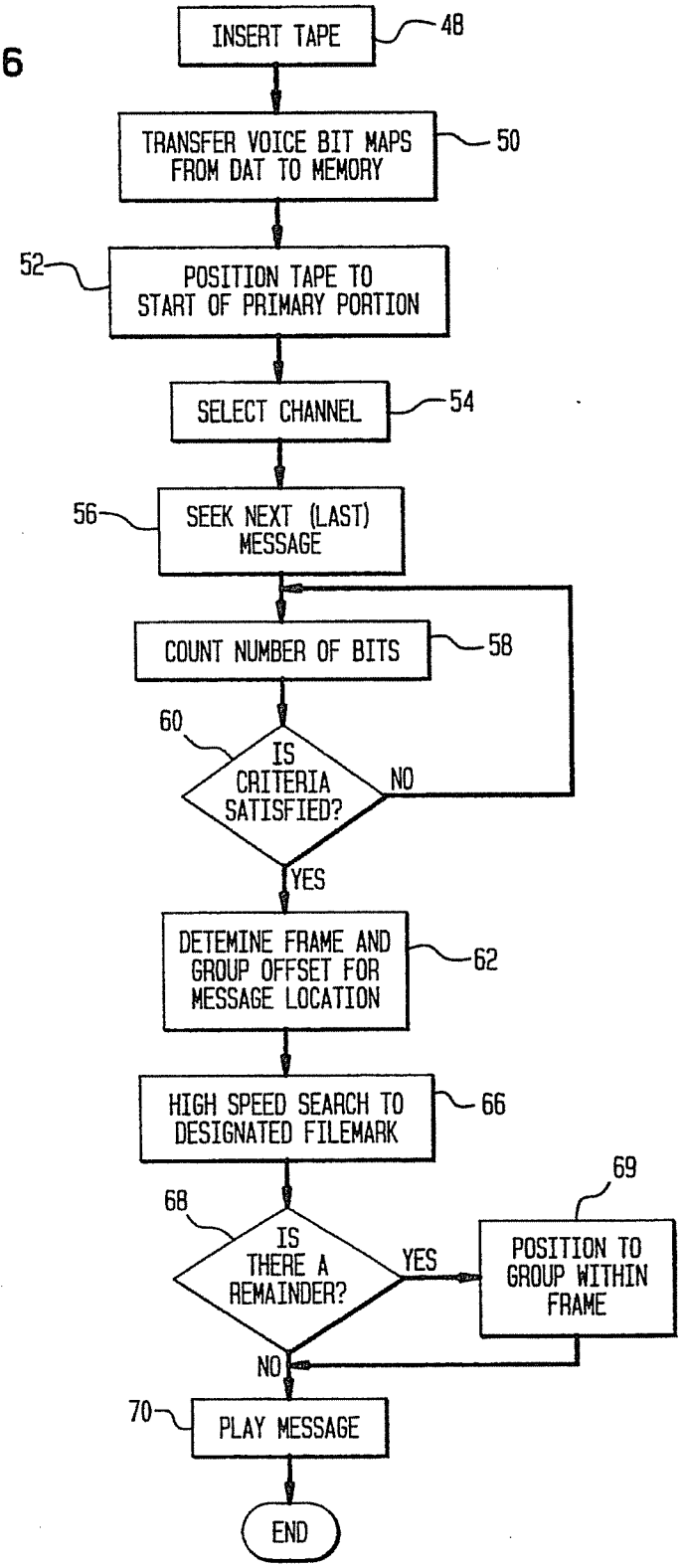

24
30
28
26
FM
HDR
GRP 1
GRP 2
GRP 3
GRP 4
GRP 5
AUDIO BLOCK TABLE
GROUP NUMBER
GROUP BOUNDARY MULTIPLIER
32
34

FIG. 6


INSERT TAPE
48
TRANSFER VOICE BIT MAPS FROM DAT TO MEMORY
50
52
POSITION TAPE TO START OF PRIMARY PORTION
SELECT CHANNEL
54
56
SEEK NEXT (LAST) MESSAGE
COUNT NUMBER OF BITS
58
60
IS CRITERIA SATISFIED?
NO
YES
DETEMINE FRAME AND GROUP OFFSET FOR MESSAGE LOCATION
62
HIGH SPEED SEARCH TO DESIGNATED FILEMARK
66
69
68
IS THERE A REMAINDER?
YES
POSITION TO GROUP WITHIN FRAME
NO
70
PLAY MESSAGE
END

APPARATUS AND METHOD OF RETRIEVING A MESSAGE FROM A DIGITAL AUDIO TAPE

BACKGROUND OF THE INVENTION

Audio loggers are known devices that are used for the purpose of preserving records of voice communication on a medium such as a tape. They have particular use in police stations, hospitals, prisons, brokerage houses and other locations where there is a need to record a message or conversation and the time and date thereof. After recording, the tapes upon which audio is written are stored for archival purposes.

Recently, digital loggers that use digital audio tapes (DATs) have become commercially available. As with any other recording medium used in a logger, or similar device, a scheme should be provided for retrieving a message or conversation in a reliable and fast manner. Unless there is a scheme whereby the presence of messages can be determined in the storage medium, a large portion of the medium must be played to retrieve the message. In particular there is a need to provide a satisfactory manner for finding a next message i.e., the presence of a message following a message to which one is listening or a previous message, i.e., the message prior to the one to which one is listening.

SUMMARY OF THE INVENTION

A novel method for searching a digital tape for the purpose of retrieving audio has been conceived that saves time and is more reliable. The instant invention allows one to not only find a message quickly but allows one to determine the next or prior message depending upon the direction of travel of the tape. Audio is initially stored in a temporary memory in which tables are created to map a profile of the audio. The DAT is divided essentially into two sections, one section referred to as a secondary partition and the second section referred to as the primary partition. Audio is written into the primary partition by a scheme that uses a plurality of frames, each frame including a file mark that divides the tape into time increments, a header and a number of audio groups where the audio is written. The header includes an audio block table that indicates where and whether audio is present on the channels from which audio is received and the groups in which the audio is written. The audio block tables of the headers are created from data stored in the temporary memory and includes every channel. Thus, as a DAT is operated, data will be written into the table that will indicate whether audio has been received and where in the frames the audio is stored. The data from the audio block tables is collected in a DOS system disc as the DAT is recording and used to generate a voice bit map table. After audio is written completely onto the primary partition of a DAT, data will be retrieved from the DOS system disc to generate a voice bit map table in the secondary partition. The voice bit map table stores a history of audio in every audio block table of each frame. In essence, the voice bit map table in the secondary partition is an accumulation of all the data in the audio block tables of all the headers on the DAT.

The method of retrieving a prior message or next next message involves searching the voice bit map table in the secondary partition of the DAT for a selected channel or channels and seeking consecutive "0" bits, which represent no audio being recorded, and consecutive "1" bits, which represent written audio. The scheme for

defining the number of consecutive 0 bits and 1 bits will be determined by the operator depending upon the type of use for the voice processing system. In one preferred embodiment, at least two consecutive 0 bits must be present followed by at least four consecutive 1 bits to establish the presence of a message. In the preferred embodiment, four 1 bits would represent 4.8 seconds. By this method, a quick search of the DAT is available that allows one to find a prior or next message on any particular channel or channels. After finding the location of the message in the bit map table of the secondary partition, the message can be retrieved from the primary partition in a quick search by counting the number of file marks and groups.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a functional block diagram showing a voice processing system with which data can be stored in the primary partition of a DAT in accordance with the instant invention.

FIG. **2** is a plan view of a digital audio tape (DAT) demonstrating various portions of the DAT;

FIG. **3** is a block diagram representing a frame of the DAT with an exploded view of an audio block table that is stored in the header of such frame;

FIG. **4** is a representation of voice bit map table stored in the secondary partition of the DAT shown in FIG. **1**;

FIG. **5** is an example of data from a single channel; and

FIG. **6** is a flow chart representing a program of a device for reading the DAT.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A scheme has been devised whereby audio, i.e. recorded voice, can be retrieved quickly and conveniently from a digital audio tape (DAT). Audio can be either in the form of a conversation or a message that is given by a single party, hereinafter referred to collectively as a message in both the disclosure and accompanying claims. For greater detail, a system in which a DAT records audio is described in copending U.S. patent application Ser. No. 08/100,401 entitled Method and Apparatus for Storing Data on a Digital Audio Tape to which reference can be had.

With reference to FIG. **1**, a digital audio logger system shown generally at **110** in which the instant invention can be performed. A plurality of audio sources **112**, such as telephones, is monitored by an interface **114** of a voice processing system **113**, which in this instance is a digital logger. Although the invention will be described with telephones, it will be appreciated the invention can be used with other sources of audio such as police radios. The interface **114** is in communication with a speaker **117** and with an analog/digital (A/D), digital/analog convertor (D/A) **116** that will convert analogue signals received from the telephones **112** to digital signals when data is flowing in one direction and digital to analog when data flows in the opposite direction. A digital signal processor **118** is in communication with the converter **116** and performs the function of compressing the digital voice signals by use of a voice compression algorithm as is known in the art. The digital signal processor **118** can be one of many commercially available processors such as a TMS 320C25 processor available from Texas Instruments Inc. The com-

pressed data is received by a controller **120** that arranges the data in a prescribed order and controls the flow of the data. In communication with the controller **120** is a clock **119** that provides the time and date and a buffer **122** that temporarily stores data. The controller **120** is also in communication with a random access storage (RAS) memory device **123**, a DOS system disc and a supervisor **121** that provides access to the system **113**.

The buffer **122** is in communication with a digital audio tape (DAT) drive **124** that is adapted to receive a DAT **126**. The controller **120** communicates with the RAS memory **123** for the purpose of writing data from the buffer **122** into the RAS at the same time data is being written into the DAT. In addition data concerning activity of the channels is written into the DOS system disc **125** to provide data for the generation of tables in the DAT **126** as will be described hereinafter.

With reference now to FIG. **2**, a representation of a DAT **126** that incorporates the instant invention is shown generally at **10** and has a beginning of the tape (BOT) **12** and an end of the tape (EOT) **14**. Adjacent to the BOT **12** is a secondary partition **16**. The secondary partition **16** can include information such as the media format, manufactures identification, product identification in terms of model numer of the recorder that formatted the DAT, the drive vendor, logic unit type, unit software version, an indication whether the tape is an original or a copy, and other information of this type. In addition, the secondary partition **16** stores a voice bit map table which will be described in greater detail with reference to FIGS. **4** and **5**. Intermediate the secondary partition **20** and the EOT **14** is the primary partition **18** in which audio is recorded from a number of channels, as for example thirty two channels. Needless to say, the primary partition **18** is by far the largest portion of the DAT **10**.

With reference to FIG. **3**, where a portion of the primary partition **18** is shown, the primary partition is made up of a number of frames **24**, each frame including a file mark **26**, a header **28** and a plurality of groups **30**, five groups being shown as an example. Each file mark **26** represents six seconds of recording, all channels being recorded during that six seconds. Each group is allocated 1.2 seconds of recording and each group is capable of receiving audio from all channels during its allotted 1.2 seconds. The header **28** has generated therein an audio block table **32** that manifests the recording of data or absence of data in each channel of each group **30**. A "0" bit indicates the lack of audio on a particular channel in a group and a "1" bit represents the presence of audio. A group boundary multiplier **34** is also included in the header so as to indicate the number of channels active in the groups. The group boundary multiplier serves as a mechanism for allowing one to quickly find audio in a given frame during playback. Reference can be had to U.S. patent application Ser. No. 08/100,401 supra, for further details relative to the structure and function of a frame. As was stated previously, audio is first stored in the buffer **122** before being written into the DAT **126**. As the audio is stored in the buffer **122**, the data for the audio block tables are collected and written into the header **28** as audio is transferred from the buffer to the headers and groups **30** of the DAT **126**.

With reference now to FIG. **4**, a portion of a bit map table is shown generally at **40** that is stored in the secondary partition **16** of the DAT **10**. Such a table **40** indicates the voice channel bits **38** and the time **42** at which the recording of each channel took place. This voice bit map table **40** is an accumulation of all the data from all the audio block tables **32** in the primary partition **18** of the DAT. This data is initially stored in the DOS system disc **125** and then written into the bit map table by the digital audio logger **110** in which the DAT **10** is recording. The logger **110**, as will be described hereinafter, or another appropriate recording device, has a memory **123** which stores the audio history of data written in the primary partition of the DAT and dumps such history into the bit map table **40** of the secondary partition **16** after the DAT has completed recording. More specifically, all the data from the audio block tables are written into the bit map table **40** in the form as shown in FIG. **4** in the secondary partition **16**. This transferring is accomplished automatically by the logger **110**. The data is stored in the memory **123** at the same time the data is written into the DAT, i.e., the memory **123** will store the data from the audio block tables from each header **28**.

With reference to FIG. **5**, a representation of a single channel and the voice activity thereon is shown. Whereas the table in FIG. **4** has a particular channel, such as channel **4**, shown vertically, FIG. **5** depicts a single channel horizontally, which channel can be any of the thirty two shown in the voice bit map table in FIG. **4**. In searching for a message, predetermined parameters must be established and satisfied. More specifically, a number of "0" bits in sequence must first be demonstrated to show that there is a discontinuance in a conversation and a number of consecutive "1" bits must be found to indicate the presence of a conversation. In one preferred embodiment, the number of consecutive 0 bits is selected as two. This represents 2.4 seconds. This simply means that if there is less than 2.4 seconds between written audio that it is probably the same message whereas if there is more than 2.4 seconds, it is most likely a different message. For the purpose of determining whether a message was recorded, in the first preferred embodiment four or more consecutive 1 bits must be present. Four 1 bits represents 4.8 seconds. In a second preferred embodiment only one 0 bit is required to represent a pause and only one 1 bit is required to show audio. Such a combination of "0"'s and "1"'s can be tailored as deemed appropriate depending upon the message filtering capability the user wishes when searching.

These schemes are useful when one wishes to find the next message after the one presently being played. The DAT would be driven until the criteria for indicating the next message is met. It will be appreciated that the DAT can travel in the forward direction for finding the next message or the reverse direction for finding the previous message.

The recording by the digital logger can be enabled by one of a number of well known ways such as loop current, voltage sensing, contact closure and VOX. Thus, the scheme for consecutive "0" bits for a pause and "1" bits for audio could be selected based upon the type of enabling scheme used.

A DAT **126** can be placed into the logger **110**, or a play back device such as a digital record module, which has a programmed processor that is programmed in a way that is illustrated by the flow chart in FIG. **6**. The data in the voice bit map table stored in the secondary partition of the DAT is copied into the memory of the playback device, which memory is preferably random

access storage. During the search for the next or previous message, the memory in the playback device is relied upon. Once the position in the voice bit map is found, the translation to the physical location on the tape is made. It will be appreciated that during a search for a next or previous message, one need not be limited to a single channel as all channels can be searched together.

With reference to the flow chart shown in FIG. **6**, the method of operation in which a message can be retrieved will be described. A DAT is inserted **48** into a digital logger **110** or other appropriately programmed playback device. It will be assumed that the data in the audio block tables **32** of the primary partition have already been transferred to the bit map table **40** in the secondary partition **16**. The data from the bit map table **40** will be transferred **50** from the secondary partition of the DAT into a RAS memory of the playback device in which the DAT is inserted **48**. The tape is positioned **52** to the start of the primary partition **18** and a particular channel for which a message is to be searched is selected **54**. Alternatively, all the channels can be searched if desired. The tape is then played and the next message is sought **56** or the last message depending upon the direction of tape movement. The number of bits is counted **58** and an inquiry is made whether the criteria for the next message is satisfied **60**. As was stated previously, this criteria can be any combination of 0's and 1's that is selected by the operator. If the criteria is not satisfied, there is return, but if the criteria is satisfied, the frame and group for a message location is determined **62**. This is accomplished by dividing the number of bits by 5 to determine the group location. It will be recalled that each frame has 5 groups and to find the message that starts with a particular group requires that a frame be divided by 5. The resulting integer and any remainder yields the location of the group in which the message starts. For example, if the message starts at the forty eighth bit, it would start of the third group of the ninth file mark of the DAT. Upon the location being determined **62**, a high speed search is made **66** to the file mark location of the tape. Once the tape has been positioned, the question is asked, is there a remainder **68**. Assuming that there is no remainder, the message is played **70**. If there is a remainder, the recorder is positioned **69** to the group within a frame which equals the remainder and the message is played **70**.

Thus, what has been shown and described is a fast and accurate method for finding the next or last message from a DAT based upon a defined criteria for the presence of a message.

The above embodiments have been given by way of illustration only, and other embodiments of the instant invention will be apparent to those skilled in the art from consideration of the detailed description. Accordingly, limitations on the instant invention are to be found only in the claims.

What is claimed is:

1. A method for searching a digital audio tape (DAT) for a message, the steps comprising:

a) creating a bit map table that writes a "1" bit for audio and a "0" bit for the absence of audio on a digital audio tape,

b) storing the bit map table in a memory,

c) scanning the memory to find a predetermined number of 0 bits in sequence,

d) scanning the portion of the memory adjacent to the predetermined number of 0 bits,

e) determining if a predetermined number of 1 bits adjacent to the predetermined number of 0 bits, and

f) identifying such combination of 0 bits and 1 bits as a message.

2. The method of claim **1** wherein the tape is scanned in the forward direction and the next message is sought.

3. The method of claim wherein the tape is scanned in the reverse direction and a previous message is sought.

4. The method of claim **1** further including the step of reproducing the message.

5. The method of claim **1** wherein the step of scanning for 0 bits includes scanning for two 0 bits in sequence and the step of scanning for 1 bits includes the step of scanning for four 1 bits in sequence.

6. The method of claim **1** further including the step of dividing the DAT into a sequence of frames with each frame having a file mark and at least one group of audio data.

7. The method of claim **1** wherein said step of creating a bit map table includes having a plurality of channels and said step of scanning the DAT includes scanning for a given channel.

8. The method of claim **1** wherein the step of creating a bit map table includes having data for a plurality of channels and said step of scanning the DAT include scanning a plurality of channels.

9. The method of claim **8** further including the step of dividing each channel into a plurality of frames.

10. A method for searching for a message on a digital audio tape (DAT) that has the capability of receiving audio from a plurality of channels when recording in a digital audio logger, the steps comprising:

a) recording audio in a primary portion of the DAT,

b) creating a bit map table in a secondary portion of the DAT that identifies the presence and absence of audio on a plurality of channels,

c) scanning the bit map table to find the presence of a message in the primary portion, and

d) playing the message.

11. The method of claim **10** wherein the step of creating a bit map table includes storing 0 bits to represent absence of audio storing 1 bits to represent presence of audio.

12. The method of claim **11** wherein said step of creating a bit map includes creating a plurality of frames in the primary portion of the DAT with each frame including a file mark followed by at least one group for recording audio.

13. The method of claim **12** wherein said step of creating at least one group for recording audio in each frame includes a plurality of audio groups.

14. The method of claim **13** further including the steps of creating a header for each frame and creating an audio block table in each header that indicates the presence or absence of audio in the plurality of groups of its respective frame.

15. The method of claim **14** further including transferring the data from the audio block tables in the DAT to a memory, and creating a bit map table in the DAT by transferring the audio block table data into a location on the DAT.

16. The method of claim **15** wherein said frames are in sequence of a first partition of said DAT and said bit map table is stored in a second partition of the DAT.

17. Apparatus for searching a digital audio tape (DAT) for a message, the steps comprising:

a) means creating a bit map table that writes a "1" bit for audio and a "0" bit for the absence of audio in sequence,

b) means for storing the bit map created by said creating means in a memory,

c) means for scanning said memory to find a predetermined number of 0 bits in sequence,

d) means for scanning the portion of said memory adjacent to a predetermined number of 0 bits,

e) means for determining a predetermined number of 1 bits adjacent to the predetermined number of 0 bits, and

f) means for identifying said combination of 0 bits and 1 bits as a message.

18. The apparatus of claim **17** further including means for playing a message identified by said identifying means.

19. The apparatus of claim **17** wherein said combination consists of two 0 bits in sequence and four 1 bits in sequence adjacent to said two 0 bits.

20. Apparatus for searching for a message on a digital audio tape (DAT) that has the capability of receiving audio from a plurality of channels and recording the received audio in a digital audio logger, the steps comprising:

a) means for recording audio in a primary portion of the DAT,

b) means for creating a bit map table in a secondary portion of the DAT that identifies the presence and absence of audio on a plurality of channels,

c) means for scanning the bit map table to find the presence of the next message in the primary portion, and

d) means for playing said message.

* * * * *

EXHIBIT B

Office Action Summary	Application No.	Applicant(s)	
	09/324,459	HENITS, JOHN	
	Examiner	Art Unit	
	Benny Q. Tieu	2642	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 June 1999* .

2a)☐ This action is FINAL. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *1* .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other:

DETAILED ACTION

Claim Objections

1. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

There are two sets of claims 32-34. The second set of claims 32-34 have been renumbered as claims 35-37, respectively.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-10, 13-15, and 24-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Knitl (U.S. Patent No. 5,195,128).

Regarding claim 1, Knitl teaches a multi-stage data logging system comprising:

a) a telecommunications ("telecom") stage (Fig. 1, Private Branch Exchange) receiving input from a plurality of input channels (Fig. 1, T1...Tn);

b) a recorder stage having one or more recorders (Fig. 1, SP and RAM in Voice Mail Server), at least one recorder storing data associated with input received from at least one of said plurality of input channels (column 3, lines 29-35);

c) a distribution stage (in Voice Mail Server "VMS") providing access to data stored in the recorder stage (SP and RAM) (column 3, lines 36-41);

d) a first interface linking the telecom (Fig. 1, PBX) and the recorder stages (VMS) and a second interface linking the recorder and the distribution stages (in VMS);

wherein at least two stages of the system (PBX and VMS) are physically separable and in operation can be located wide distances apart (Figs. 1 & 2).

Regarding claim 2, Knitl further teaches the data logging system wherein the telecom stage comprises:

a) a first interface (in PBX) capturing signals from said plurality of input channels (T1...Tn);

b) one or more signal processors converting captured signals into data having a predetermined format (column 3, line 66 through column 4, line 1); and

c) a second interface for transmitting said converted data to said recorder stage (column 4, lines 2-4).

Regarding claim 3, Knitl further teaches the data logging system wherein the telecom stages further comprises at least one analog to digital signal converter (A/D converter in Fig. 1).

Regarding claim 4, Knitl further teaches the data logging system wherein said one or more data processors provide data compression (column 4, line 25).

Regarding claim 5, Knitl further teaches the data logging system wherein the telecom stage provides time stamping of the received input (column 3, line 44).

Regarding claim 6, Knitl further teaches the data logging system wherein the telecom stage provides authentication of signals from said plurality of input channels (column 5, lines 8-11).

Regarding claim 7, Knitl further teaches the data logging system wherein said one or more data processors encrypt the converted data (column 5, lines 28-37).

Regarding claim 8, Knitl further teaches the data logging system wherein the recorder stage comprises a controller for directing and monitoring recorder stage operations, and each recorder

comprises:

a) a first interface receiving data from the telecom stage (Fig. 1, S);

b) a buffer for transitional data storage (Fig. 1, SP and RAM);

c) a hard disk drive for data storage (Fig. 1, SP and RAM); and

d) a second interface for transmitting stored data to the distribution stage (column 4, lines 39-68).

Regarding claims 9 and 14, Knitl further teaches the data logging system wherein the recorder stage still further comprises an archive storage device for archiving data (Fig. 1, SP and RAM).

Regarding claims 10 and 15, Knitl further teaches the data logging system wherein said archive storage device is fixed (Fig. 1, SP and RAM).

11. The data logging system of claim 9 wherein said archive storage device is a RAID array.

12. The data logging system of claim 9 wherein said archive storage device is removable.

Regarding claim 13, see column 5, lines 1-37.

Regarding claim 24, Knitl teaches a multi-stage data logging system comprising:

a) a first means (Fig. 1, PBX) for receiving signals from one or more input channels (Fig. 1, T1...Tn);

b) a second means (Fig. 1, VMS) for recording data associated with received signals from T1...Tn;

c) a third means (Fig. 1, VMS) for retrieving stored data and distributing retrieved data to one or more output channels (T1...Tn);

wherein at least two of said first, second, and third means (PBX and VMS) are physically separable and can operate wide distances apart (Figs. 1 & 2).

Regarding claim 25, Knitl further teaches the data logging system further comprising an archive storage device for archiving data from said one or more input channels (Fig. 1, SP & RAM).

Regarding claim 26, it should be noticed that Knitl teaches a voice system.

Regarding claim 27, Knitl teaches a data logger, comprising:

a telecommunication device (Fig. 1, PBX) receiving input from a plurality of data sources (Fig. 1, T1...Tn);

a processor converting input from said plurality of data sources to one or more data formats (column 3, line 66 through column 4, line 1);

a memory for storing converted data corresponding to the received input from said plurality of data sources (Fig. 1, SP and RAM);

a communication path (path between PBX and VMS); and

a server (Fig. 1, VMS) transferring stored data from one or more of said plurality of data sources (SP & RAM) via the communication path (path between PBX and VMS) to at least one remote user (Fig. 1, T1...Tn).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 11-12 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knitl.

Regarding claims 11-12 and 16-17, RAID and removable disks are well known in the art (examiner takes official notice for this effect). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of RAID or removable disks as well known in the art into the method and system disclosed by Knitl for redundant purposes.

6. Claims 18-23 and 28-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knitl as applied to claim 1 above, and further in view of Steele (U.S. Patent No. 4,692,819).

Regarding claims 18-23 and 28-34, Knitl fails to teach a method and system for recording information on Web server and Internet. However, Steele teaches a method and apparatus for controlling the position of a transported Web wherein a web of magnetic tape is connected to an apparatus for recording and reproducing of video information from the tape (column 4, lines 32-57). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of Web server as taught by Steele into the method and system disclosed by Knitl in order for a recorder no longer limited to record voice mail only, but it can be operated to record and reproduce of video information on the Web.

7. Claims 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knitl, and further in view of Daly et al. (U.S. Patent No. 5,819,005).

Regarding claim 35, the limitations of the claim are rejected for the same reasons as set forth in previous claims. Knitl fails to teach a backup recorder that is used to backup all the records in case a malfunction recorder is detected. However, Daly discloses this feature (column 3, lines 41-47). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of backup recorder as taught by Daly into the method disclosed by Knitl in order to backup all information in case either of the recorder is destroyed for any reason.

Regarding claims 36 and 37, the limitations of the claim are rejected for the same reasons as set forth in previous claims. Knitl fails to teach the feature of increasing channels for the recording capacity in case of input channels is more than the recording channels. However, Daly teaches this feature (Abstract, column 1, lines 19-29, and column 2, lines 8-30). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of increasing channels for recorder as taught by Daly into the method disclosed by Knitl so that the capacity of a logger can be increased as required.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Barbier et al. (U.S. Patent No. 5,142,527) teaches a voice message equipment for an automatic exchange. Kurano et al. (U.S. Patent No. 5,813,010) teaches an information storage and information transmission media with parental control. Dilip et al. (U.S. Patent No. 6,094,673) teaches a method and apparatus for generating agent scripts.

9. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 308-6306, (for formal communications intended for entry, please label the response "EXPEDITED PROCEDURE")

Or: (703) 308-6296, (for informal or draft communication, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Benny Q. Tieu whose telephone number is (703) 305-2360. The examiner can normally be reached on Monday-Friday: 6:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ahmad Matar can be reached on (703) 305-4731. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-6306 for regular communications and (703) 308-9051 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

Benny Q. Tieu
Examiner
Art Unit 2642

BQT
March 14, 2001

AHMAD MATAR
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

EXHIBIT C

Interview Summary	Application No.	Applicant(s)	
	10/111,767	GRITZER ET AL.	
	Examiner	Art Unit	
	Bing Q Bui	2642	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Bing Q Bui*. (3)*David Leason*.

(2) *Abraham Hershkovitz*. (4)*Mordechay Golan*.

Date of Interview: *12 April 2005*.

Type: a)☐ Telephonic b)☐ Video Conference
c)☒ Personal [copy given to: 1)☐ applicant 2)☒ applicant's representative]

Exhibit shown or demonstration conducted: d)☐ Yes e)☒ No.
If Yes, brief description: _____.

Claim(s) discussed: *1 and 34*.

Identification of prior art discussed: *Ishizaki and Rust*.

Agreement with respect to the claims f)☒ was reached. g)☐ was not reached. h)☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: *It is agreed that the amendment to claims 1 and 34 (see attachments) has overcome the prior art of record*.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

BING Q. BUI
PRIMARY EXAMINER

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

Examiner's signature, if required

IP data Inc

Claims Agreed to During Interview

1. (Currently Amended) A method for recording at least a portion of a plurality of IP data sessions each being between at least a first communication device and a second communication device through a network by a remotely located recording device, comprising:

initiating ~~the~~ each IP data session by ~~a~~ said first communication device and establishing a connection with said second communication device;

implementing the data session as a conference call through a conference controller in response to initiating the data session such that said first and second communication devices are respectively first and second participants therein by the conference controller;

using the conference controller, entering the remotely located recording device to said conference call as an additional participant; and

recording the data session through said conference call using said recording device.

2. (Canceled)

3. (Original) The method of claim 1, wherein the data session is an IP telephony session.

4. (Original) The method of claim 1, wherein the data session is an IP multimedia session.

5-24 (Canceled).

25.: Canceled.

26: Canceled.

27: Canceled.

28. (Previously Presented) The method of claim 3, wherein initiating the data session is detected by a recording agent, and said recording agent contacts the recording device.

29. Canceled. ~~(Previously Presented) The method of claim 28, wherein a conference controller implements said conference call~~.

30. (Currently amended) The method of claim 1~~29~~, wherein said conference controller is a MCU.

31. (Previously Presented) The method of claim 4, wherein initiating the data session is detected by a recording agent, and said recording agent contacts the recording device.

32. (Previously Presented) The method of claim 4, wherein said first communication device is a gateway for receiving communication through a PSTN.

33: (Previously Presented) The method of claim 3, wherein the recording device joins the data session through a hunt group.

46. (Previously Presented) The method of claim 1, wherein the step of entering the recording device to said conference call is in response to a command that the data session is to be recorded.

47. (Previously Presented) The method of claim 46, including the additional step of providing the command from a scheduler.

48. (Previously Presented) The method of claim 47, including the additional step of locating the scheduler with the recording device.

49. (Previously Presented) The method of claim 47, including the additional step of analyzing information about the IP data session at the scheduler to determine whether the IP data session is to be recorded.

50. (Previously Presented) The method of claim 49, wherein the information includes the identity of at least one of the first and second communication devices.

51. (Previously Presented) The method of claim 1, including the additional step of permitting a user of at least one of the first and second communication devices to determine whether the session is to be recorded prior to entering the recording device as the additional participant.

52. (Previously Presented) The method of claim 1, wherein the connection with the second communication device is established by passing IP addresses to a gatekeeper for performing IP address resolution and connecting to a device associated with the resolved IP address.

53. (Currently Amended) The method of claim 1~~29~~, wherein the conference controller implements said conference call in response to ~~receipt of~~ a request to initiate the conference call.

54. (Previously Presented) The method of claim 53, wherein the request is from at least one of the recording device, the first communication device, the second communication device, and an other component on the network.

55. (Previously Presented) The method of claim 33, including the additional step of the gatekeeper identifying the hunt group.

56. (Previously Presented) The method of claim 55, including the additional step of the gatekeeper searching for a free line within the identified hunt group.

34. (Currently Amended) A system for recording an IP communication session through ~~a an IP~~ network, comprising:

(a) ~~a first input for~~ a first communication device for initiating the IP communication session;

(b) ~~a conference controller for implementing a conference call with said first communication device for the IP communication session;~~

~~(c)~~ ~~a second input for~~ a second communication device ~~for being~~ connected as a communication participant in ~~said~~ the IP communication session;

(c) a conference controller for implementing the IP communication session as a conference call; and which is distinct from the first and second communication devices

(d) a recording device ~~for participating being~~ connected as an additional communication participant in said conference call by the conference controller, thereby to enable said recording device to record the IP communication session.

35. (Previously Presented) The system of claim 34, further comprising a second communication device for participating in the IP communication session through said conference call, wherein said first communication device is located on a separate network portion from said second communication device.

36. (Previously Presented) The system of claim 35, wherein said separate network portion is a different network segment.

37. (Previously Presented) The system of claim 35, wherein said separate network portion is a different network.

38. (Currently Amended) The system of claim 34, wherein said conference controller is a MCU~~recording device is the NiceLog™ product~~.

39. (Previously Presented) The system of claim 34, further comprising:

(e) a gatekeeper for receiving said request from said first communication device to initiate the IP communication session and for sending a request to said conference controller to initiate said conference call.

40. (Previously Presented) The system of claim 39, further comprising:

(f) a recording agent for controlling said recording device.

41. (Previously Presented) The system of claim 40, further comprising:

(g) a recording agent control module for initiating participation of said recording device in said conference call.

42. (Previously Presented) The system of claim 40, wherein said recording device and said recording agent are implemented in a single device.

43. (Currently Amended) The system of claim 40, further comprising a telephone device connected to said gatekeeper through a PSTN for participating in the IP communication session as one of the first and second communication devices.

44. (Previously Presented) The system of claim 43, further comprising a scheduler for determining whether the IP communication session is recorded, said scheduler controlling said recording device.

45. (Previously Presented) The system of claim 44, wherein said conference controller is a MCU.

57. (Previously Presented) The system of claim 34, wherein the recording device is present on the IP network with the conference controller.

58. (Previously Presented) The system of claim 34, wherein the conference controller enables the recording device to participate in the conference call, and wherein the recording device receives communication exclusively through the conference controller.

59. (Currently Amended) The system of claim 39, wherein the gatekeeper passes the communication~~data~~ session to the recording device.

60. (Previously Presented) The system of claim 44, wherein the scheduler analyzes information about the IP multimedia session to determine whether the IP communication session is to be recorded.

61. (Previously Presented) The system of claim 60, wherein the information includes the identity of at least one of the first and second communication devices.

EXHIBIT D

US006122665A

United States Patent [19]

Bar et al.

[11] **Patent Number: 6,122,665**

[45] **Date of Patent: Sep. 19, 2000**

[54] **COMMUNICATION MANAGEMENT SYSTEM FOR COMPUTER NETWORK-BASED TELEPHONES**

[75] Inventors: **Eitan Bar**, Tzoran; **Mordechai Nisani**, Tel Aviv, both of Israel

[73] Assignee: **STS Software System Ltd.**, Tel Aviv, Israel

[21] Appl. No.: **09/140,453**

[22] Filed: **Aug. 26, 1998**

[51] **Int. Cl.**[7] **G06F 15/173**

[52] **U.S. Cl.** **709/224**; 709/204; 379/88

[58] **Field of Search** 709/204, 205, 709/206, 207, 224, 227; 345/302; 379/67, 70, 88

[56] **References Cited**

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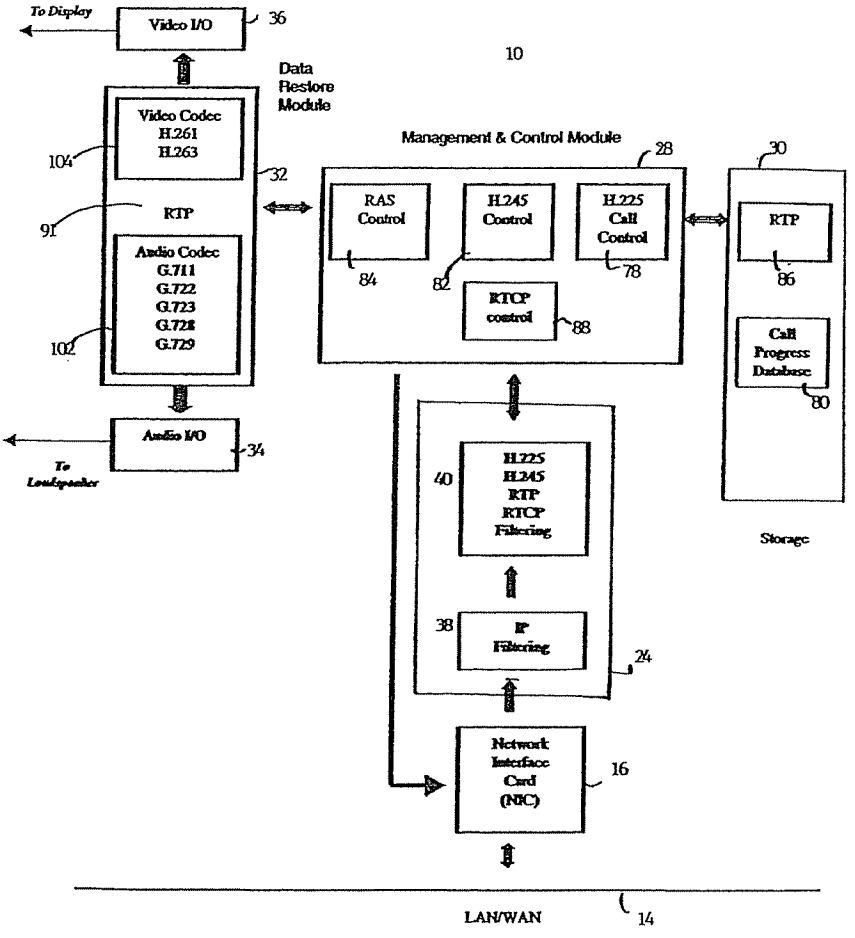
Primary Examiner—Dung C. Dinh

Attorney, Agent, or Firm—Mark M. Friedman

[57] **ABSTRACT**

A system and a method for monitoring a computer network to detect data packets including audio or video data, such packets being part of a communication session, for storing these packets and for reconstructing the communication session upon request.

23 Claims, 8 Drawing Sheets



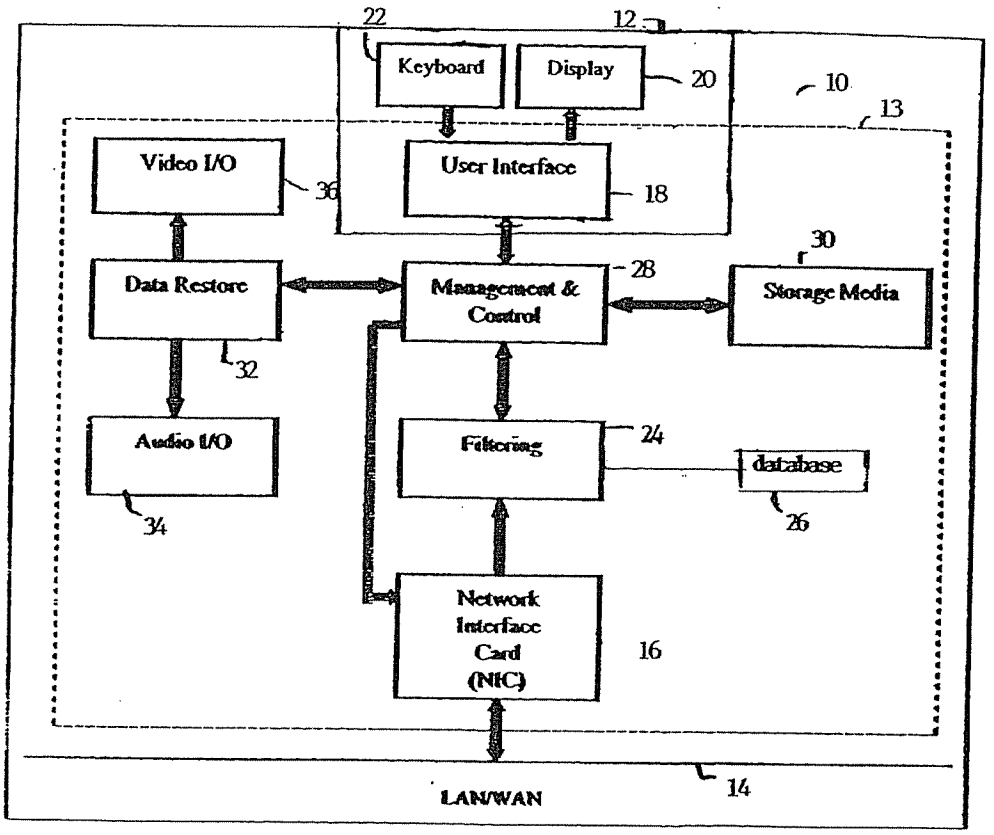

22
12
Keyboard
Display
20
10
13
Video I/O
36
User Interface
18
30
Data Restore
28
Management & Control
Storage Media
32
Audio I/O
Filtering
24
database
34
26
Network Interface Card (NIC)
16
LAN/WAN
14

FIG. 1

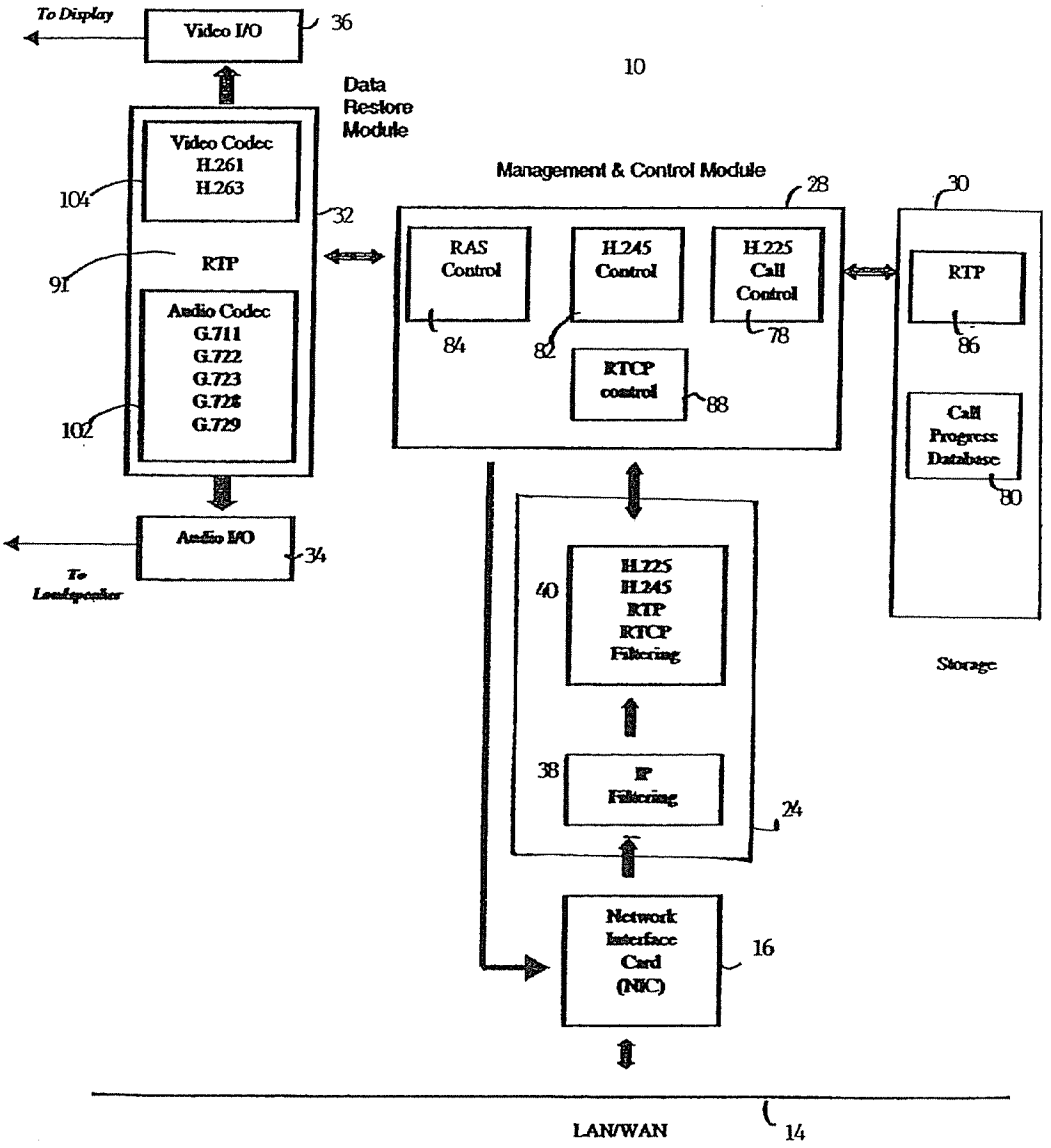

To Display
Video I/O
36
10
Data Restore Module
Video Codec H.261 H.263
104
32
RTP
91
Audio Codec G.711 G.722 G.723 G.728 G.729
102
Audio I/O
34
To Loudspeaker
Management & Control Module
28
30
RAS Control
H.245 Control
H.225 Call Control
84
82
78
RTCP control
88
RTP
86
Call Progress Database
80
Storage
40
H.225 H.245 RTP RTCP Filtering
38
IP Filtering
24
Network Interface Card (NIC)
16
LAN/WAN
14

FIG. 2

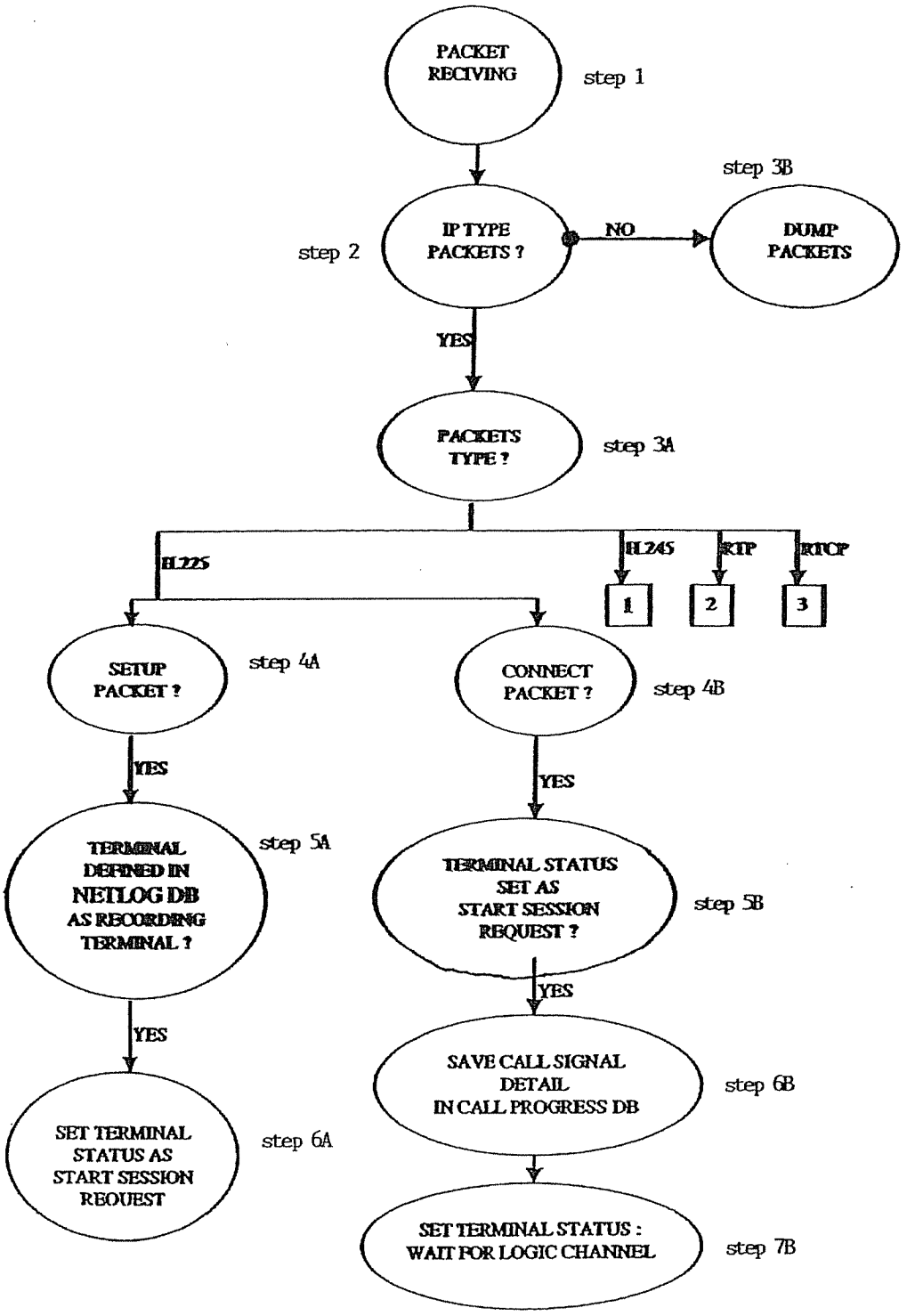

PACKET RECIVING
step 1
step 3B
IP TYPE PACKETS ?
step 2
NO
DUMP PACKETS
YES
PACKETS TYPE ?
step 3A
H225
H245
RTP
RTCP
1
2
3
SETUP PACKET ?
step 4A
CONNECT PACKET ?
step 4B
YES
YES
TERMINAL DEFINED IN NETLOG DB AS RECORDING TERMINAL ?
step 5A
TERMINAL STATUS SET AS START SESSION REQUEST ?
step 5B
YES
YES
SET TERMINAL STATUS AS START SESSION REQUEST
step 6A
SAVE CALL SIGNAL DETAIL IN CALL PROGRESS DB
step 6B
SET TERMINAL STATUS : WAIT FOR LOGIC CHANNEL
step 7B

FIG. 3A

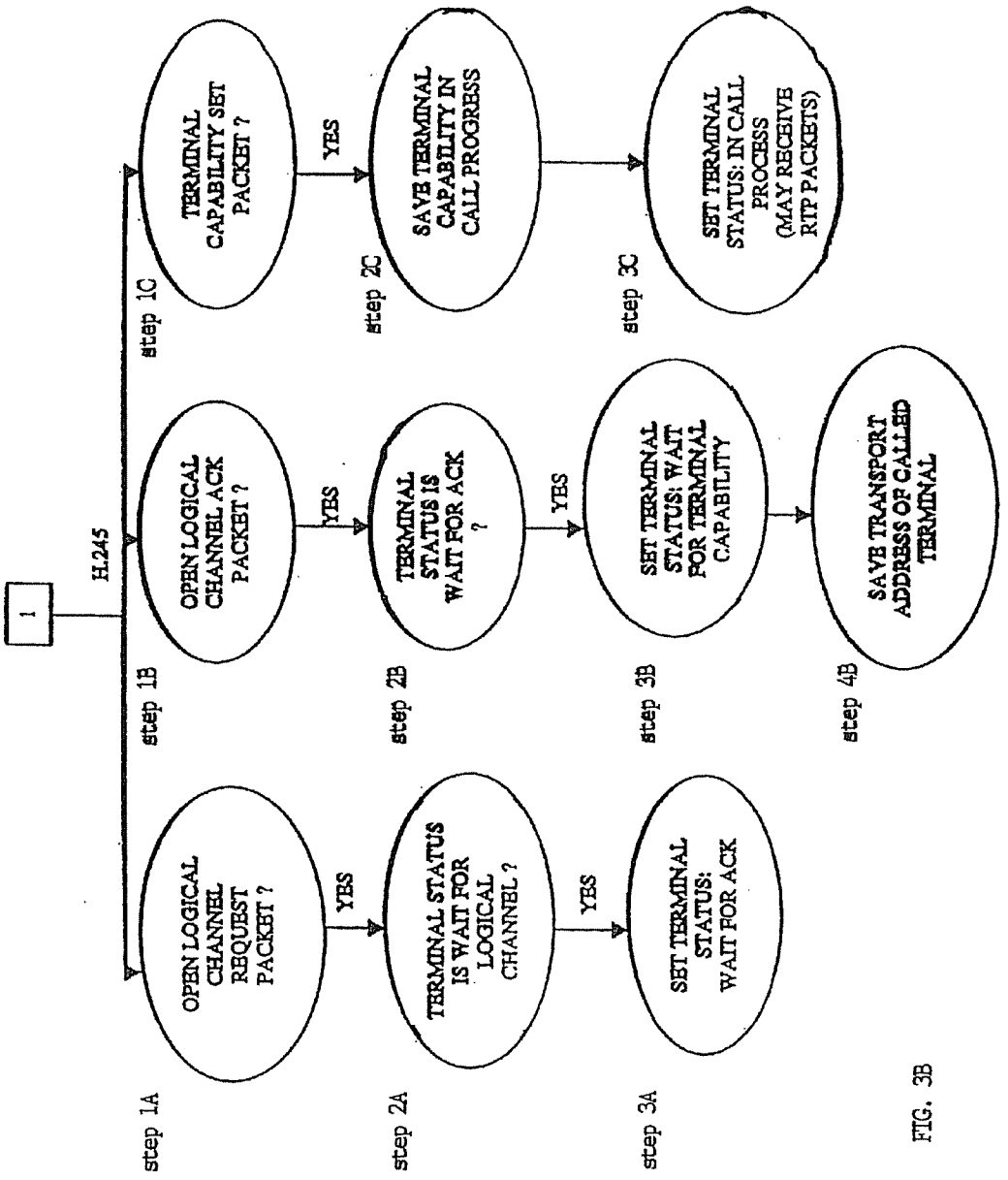

1
H.245
OPEN LOGICAL CHANNEL REQUEST PACKET ?
YES
TERMINAL STATUS IS WAIT FOR LOGICAL CHANNEL ?
YES
SET TERMINAL STATUS: WAIT FOR ACK
step 1A
step 2A
step 3A
OPEN LOGICAL CHANNEL ACK PACKET ?
YES
TERMINAL STATUS IS WAIT FOR ACK ?
YES
SET TERMINAL STATUS: WAIT FOR TERMINAL CAPABILITY
SAVE TRANSPORT ADDRESS OF CALLED TERMINAL
step 1B
step 2B
step 3B
step 4B
TERMINAL CAPABILITY SET PACKET ?
YES
SAVE TERMINAL CAPABILITY IN CALL PROGRESS
SET TERMINAL STATUS: IN CALL PROCESS (MAY RECEIVE RTP PACKETS)
step 1C
step 2C
step 3C

FIG. 3B

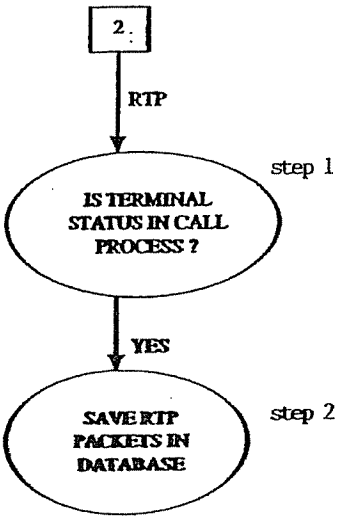


FIG. 3C

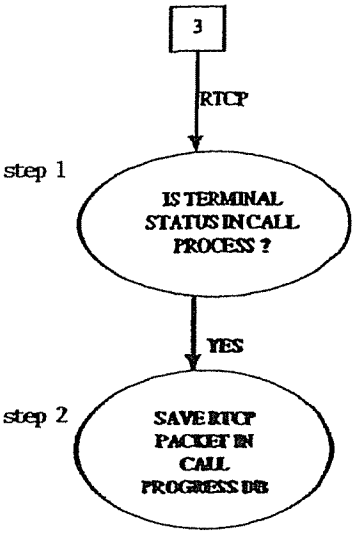


FIG. 3D

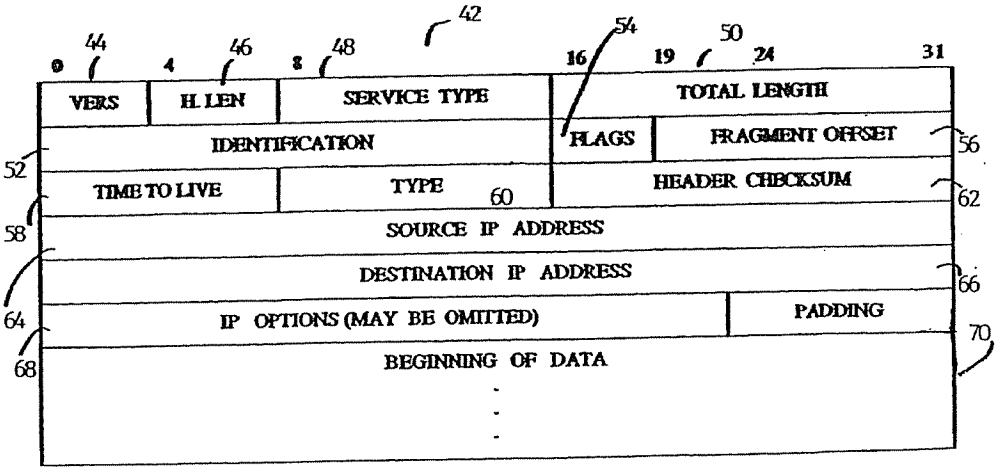


FIG. 4A

H.225 and H.245 packet

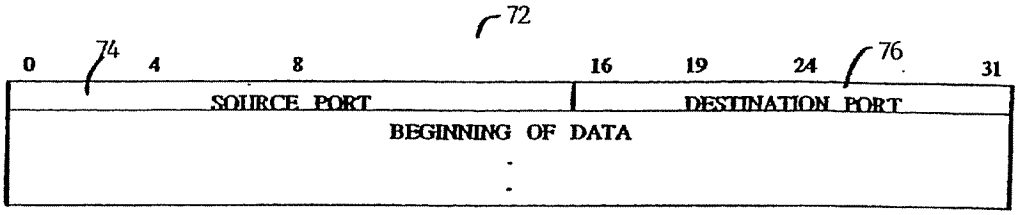


FIG. 4B

RTP packet

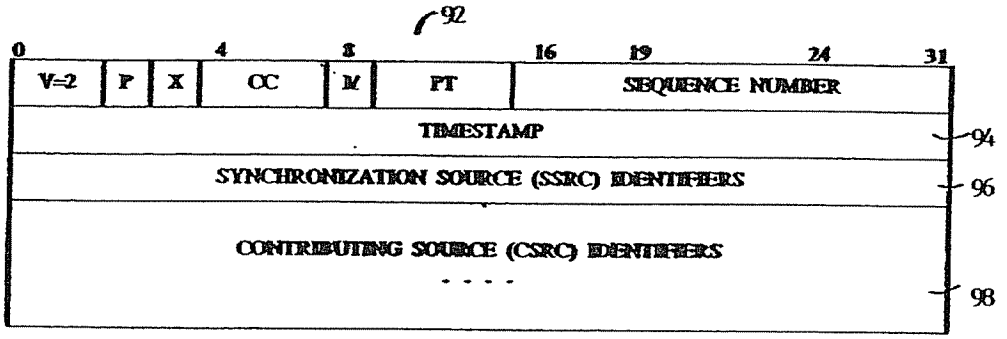


FIG. 4C

RTCP packet

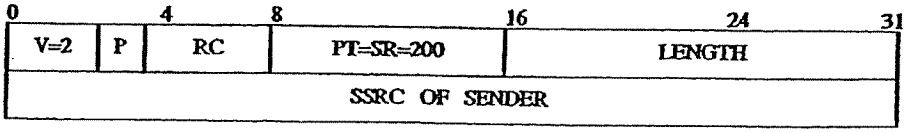


FIG. 4D

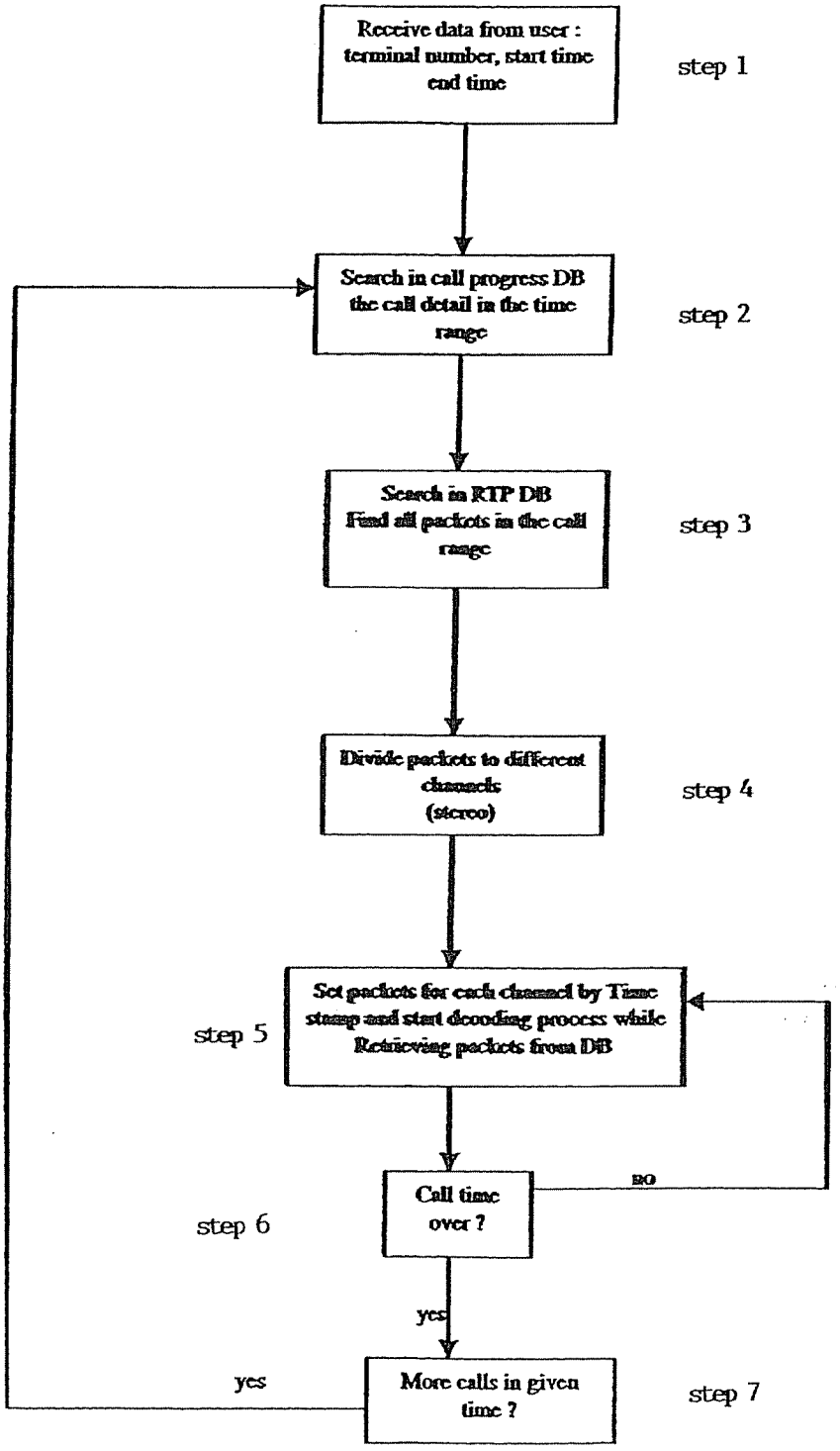

Receive data from user : terminal number, start time end time
step 1
Search in call progress DB the call detail in the time range
step 2
Search in RTP DB Find all packets in the call range
step 3
Divide packets to different channels (stereo)
step 4
Set packets for each channel by Time stamp and start decoding process while Retrieving packets from DB
step 5
Call time over ?
no
step 6
yes
More calls in given time ?
yes
step 7

FIG. 5

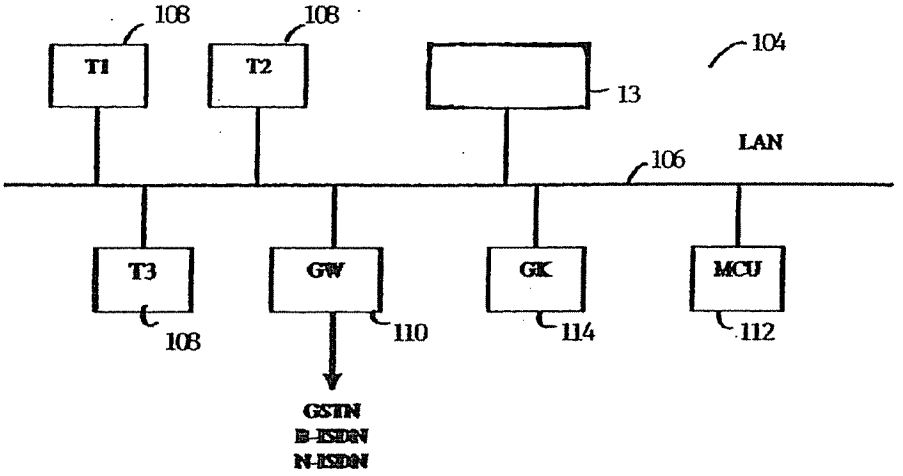

108
108
T1
T2
13
104
LAN
106
T3
GW
GK
MCU
108
110
114
112
GSTN
B-ISDN
N-ISDN

FIG. 6

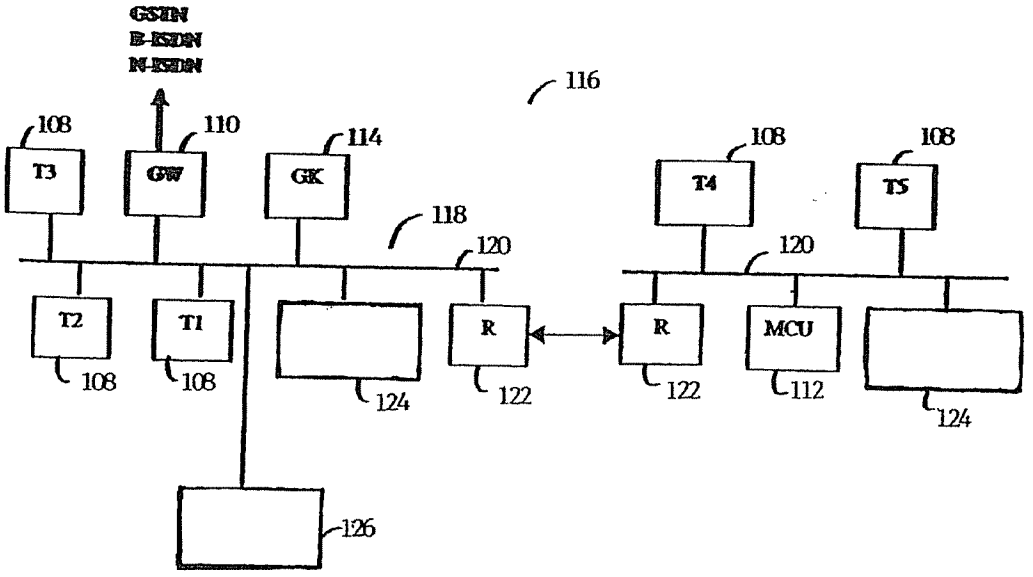

GSTN
B-ISDN
N-ISDN
116
108
110
114
108
108
T3
GW
GK
T4
T5
118
120
120
T2
T1
R
R
MCU
108
108
124
122
122
112
124
126

FIG. 7

COMMUNICATION MANAGEMENT SYSTEM FOR COMPUTER NETWORK-BASED TELEPHONES

FIELD AND BACKGROUND

The present invention is of a method and a system for the management of communication sessions for computer network-based telephone communication, and in particular for the identification of packets containing audio and/or video data, for the storage of these packets, and for the reconstruction of selected communication sessions for audio and/or video display as needed.

The integration of the computer into office communication systems has enabled many functions previously performed by separate devices to be combined into a single management system operated through a computer. For example, computer-based voice logging systems enable a computer to receive voice communication through a hardware connection to the regular telephony network, to record either a conversation, in which at least two parties converse, or a message from at least one party to one or more parties, and to replay these recorded conversations or messages upon request. These voice logging systems can replace mechanical telephone answering machines.

The computer logging systems have many advantages over the mechanical answering machines. For example, the voice messages can be stored in a computer-based storage medium, such as a DAT cassette, which has a greater storage capacity than regular audio cassettes. Furthermore, the stored voice messages can be organized in a database, such that the messages can retrieved according to time, date, channel, dialed number or caller identification, for example. Such organization is not possible with a mechanical telephone answering machine. Thus, computer logging systems for voice messages have many advantages over mechanical answering machines.

Unfortunately, currently available computer logging systems have the disadvantage of being unable to record telephone communication sessions, whether conversations or messages, for voice communication being performed through a LAN (local area network) or a WAN (wide area network). Although these logging systems can play back voice messages to a remote user through a LAN, for example, they cannot record such a message if it is transmitted by a LAN-based telephone. Such LAN and WAN based teleph6ne communication has become more popular recently, since it enables telephone communication to be performed between various parties at physically separated sites without paying for local regular telephony network services, thereby saving money.

Furthermore, LAN and WAN based telephone communication also facilitates the transmission of video as well as audio information. Video information certainly cannot be recorded by currently available computer logging systems. Thus, the inability of computer logging systems to record telephone communication sessions for telephone communication being performed through a LAN or a WAN, including both video and audio data, is a significant disadvantage of these systems.

There is therefore a need for, and it would be highly advantageous to have, a system and a method for recording telephone communication sessions performed over a computer network such as a LAN or a WAN, which would record both audio and video information, organize such information, and then display such information upon request.

SUMMARY OF THE INVENTION

It is one object of the present invention to provide a system and a method for recording communication sessions performed over a computer network.

It is another object of the present invention to provide such a system and method for analyzing data transmitted over the computer network in order to detect audio and video data for recording.

It is still another object of the present invention to provide such a system and method for displaying recorded video and audio data upon request.

It is yet another object of the present invention to provide such a system and method for analyzing, recording and displaying communication sessions conducted with a LAN-based telephone system.

These and other objects of the present invention are explained in further detail with regard to the drawings, description and claims provided below.

The present invention provides a system and a method for analyzing data packets on a computer network, for selectively recording audio and video data packets, for organizing this stored information and for displaying the stored information upon request, such that communication sessions with computer network-based "telephone" systems can be logged.

According to the teachings of the present invention, there is provided a system for managing a communication session over a computer network, the system comprising: (a) a network connector for connecting to the computer network and for receiving data packets from the computer network; (b) a filtering unit for filtering the data packets and for accepting the data packets substantially only if the data packets contain data selected from the group consisting of audio data and video data, such that the data packets form at least a portion of the conununication session and such that the data packets are selected data packets; (c) a management unit for receiving the selected data packets and for storing the selected data packets, such that the selected data packets are stored data packets; and (d) a storage medium for receiving and for storing the stored data packets from the management unit, such that the at least a portion of the communication session is stored.

Preferably, the system further comprises (e) a data restore unit for retrieving and displaying the at least a portion of the communication session, the data restore unit requesting the data packets from the storage medium through the management unit, and the data restore unit reconstructing the data packets for displaying the at least a portion of the communication session.

More preferably, the data restore unit further comprises a communication session display unit for displaying the at least a portion of the communication session. Most preferably, the communication session display unit is selected from the group consisting of a video unit and an audio unit.

According to preferred embodiments of the present invention, the system further comprises (f) a database connected to the filtering unit for storing filtering information, the filtering information including at least one IP address of a party whose communication sessions are monitored; wherein the filtering unit accepts the data packets according to the filtering information, such that the filtering unit substantially only accepts the data packets if the data packets fulfill the filtering information.

Preferably, the system further comprises (g) a user computer for receiving at least one command of a user and for

displaying information to the user, such that the user determines the filtering information according to the at least one command of the user.

More preferably, the computer network is selected from the group consisting of a LAN (local area network) and a WAN (wide area network). Most preferably, the computer network is a LAN (local area network).

According to further preferred embodiments of the present invention, the LAN is divided into at least two segments, the system further comprising: (h) a local management unit for each segment, the local management unit including the filtering unit and the management unit; and (i) a central management unit for controlling the local management units, the central management unit controlling storage in the storage medium.

Preferably, the network connector is a network interface card.

According to another embodiment of the present invention, there is provided a method for storing at least a portion of a communication session performed on a computer network, the communication session being performed between a packet source and a packet destination, the steps of the method being performed by a data processor, the method comprising the steps of: (a) receiving a data packet from the packet source on the computer network; (b) analyzing the data packet to determine if the data packet is an IP packet; (c) if the data packet is the IP packet, filtering the IP packet to determine a type of the IP packet; and (d) storing the IP packet to form a stored data packet according to the type, such that the stored data packet forms at least a portion of the communication session. Preferably, the step of analyzing the data packet is performed by examining a header of the data packet.

According to a preferred embodiment of the present invention, the step of filtering the IP packet is performed by examining the header of the IP packet.

Preferably, the step of filtering the IP packet further comprises the steps of: (i) examining the header of the IP packet to determine an IP address of the packet source; (ii) determining if the IP address is a recorded IP address; (iii) passing the IP packet to form a passed IP packet substantially only if the IP address is the recorded IP address; and (iv) alternatively, dumping the IP packet.

More preferably, the step of determining if the IP address is the recorded IP address is performed by comparing the IP address to a list of IP addresses from packet sources, such that if the IP address is included in the list, the IP address is the recorded IP address.

Also preferably, the step of filtering the IP packet further comprises the steps of: (v) determining whether the passed IP packet is an H.225 packet, a H.245 packet, an RTP packet or an RTCP packet; (vi) if the type of the passed IP packet is the H.225 packet, determining whether the H.225 packet is a setup packet or a connect packet; (vii) if the H.225 packet is the setup packet, setting a status flag as "start session request"; (viii) alternatively, if the H.225 packet is the connect packet and the status flag is "start session request", storing at least one detail of the communication session; and (ix) setting the status flag as "wait for logic channel".

More preferably, the step of filtering the IP packet further comprises the steps of: (x) alternatively, if the type of the passed IP packet is the H.245 packet, determining whether the H.245 packet is an open logical channel request packet, an open logical channel acknowledgment packet or a terminal capability set packet; (xi) if the H.245 packet is the open logical channel request packet and the status flag is "wait for logic channel", setting the status flag as "wait for acknowledgment"; (xii) alternatively, if the H.245 packet is the open logical channel acknowledgment packet and the status flag is "wait for acknowledgment", performing the steps of: (A) setting the status flag as "wait for terminal capability"; and (B) saving a transport address of the destination of the communication session; and (xiii) also alternatively, if the H.245 packet is the terminal capability set packet, performing the steps of: (A) storing a capability of the packet destination from the terminal capability packet; and (B) setting the status flag as "in call process".

Most preferably, if the status flag is "in call process" and the type of the passed IP packet is the RTP packet, the RTP packet is stored. Also most preferably, if the status flag is "in call process" and the type of the passed IP packet is the RTCP packet, the RTCP packet is stored.

According to another preferred embodiment of the present invention, the method further comprises the steps of: (e) retrieving the stored data packet to form a retrieved data packet; and (i) reconstructing at least a portion of the communication session according to the retrieved data packet.

Preferably, the step of retrieving the data packet includes the steps of: (i) receiving a source IP address of the packet source, a start time of the communication session, and an end time of the communication session; and (ii) selecting at least one communication session according to the source IP address, the start time and the end time.

Also preferably, the step of reconstructing at least a portion of the communication session includes displaying audio data.

Alternatively and also preferably, the step of reconstructing at least a portion of the communication session includes displaying video data.

More preferably, the step of reconstructing at least a portion of the communication session further comprises the steps of: (i) retrieving substantially only RTP packets; (ii) examining a header of the RTP packets to determine a time stamp for each of the RTP packets; and (iii) displaying the RTP packets in an order according to the time stamp.

Hereinafter, the term "communication session" includes both a conversation, in which at least two parties converse by exchanging audio and/or video information in "real time", and a message, in which at least one party records such audio and/or video information for reception by at least one other party at a later date.

Hereinafter, the term "Internet" is used to generally designate the global, linked web of thousands of networks which is used to connect computers all over the world. As used herein, the term "intranet" includes other types of computer networks, such as LAN (local area networks) or WAN (wide area networks). The term "computer network" includes any connection between at least two computers which permits the transmission of data, including both Internet and intranet. The term "regular telephony network" includes POTS (plain old telephone system) and substantially any other type of telephone network which provides services through a regular telephone services provider, but which specifically excludes audio and/or video communication performed through any type of computer network.

Hereinafter, the term "computer" includes, but is not limited to, personal computers (PC) having an operating system such as DOS, Windows™, OS/2™ or Linux; Macintosh™ computers; computers having JAVA™-OS as the operating system; and graphical workstations such as the

computers of Sun Microsystems™ and Silicon Graphics™, and other computers having some version of the UNIX operating system such as AIX or SOLARIS™ of Sun Microsystems™; or any other known and available operating system. Hereinafter, the term "Windows™" includes but is not limited to Windows95™, Windows 3.x™ in which "x" is an integer such as "1", Windows NT™, Windows98™, Windows CE™ and any upgraded versions of these operating systems by Microsoft Inc. (Seattle, Wash., USA).

Hereinafter, the term "logging" refers to the process of analyzing data packets on a network to locate audio and/or video data, and of recording such data in an organized system. Hereinafter, the term "display" includes both the visual display of video data, and the production of sound for audio data.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is herein described, by way of example only, with reference to the accompanying drawings, wherein:

FIG. **1** is a schematic block diagram of an exemplary communication session monitoring system according to the present invention;

FIG. **2** is a schematic block diagram of the software modules required for operating the system of FIG. **1**;

FIGS. **3**A–3D are flowcharts of exemplary filtering and recording methods according to the present invention;

FIGS. **4**A–4D are schematic block diagrams showing the headers of H.225 (FIG. **4**A), H.245 (FIG. **4**B), RTP (FIG. **4**C) and RTCP (FIG. **4**D) packets, as they relate to the present invention;

FIG. **5** is a flowchart of an exemplary communication session playback method according to the present invention;

FIG. **6** is a schematic block diagram of an exemplary first embodiment of a basic system using the communication session monitoring system of FIGS. **1** and **2** according to the present invention; and

FIG. **7** is a schematic block diagram of an exemplary second embodiment of a zone system according to the present invention.

DESCRIPTION OF BACKGROUND ART

The following description is intended to provide a description of certain background methods and technologies which are optionally used in the method and system of the present invention. The present invention is specifically not drawn to these methods and technologies alone. Rather, they are used as tools to accomplish the goal of the present invention, which is a system and a method for analyzing data packets on a computer network, for selectively recording audio and video data packets, for organizing this stored information and for displaying the stored information upon request, such that communication sessions with computer network-based "telephone" systems can be logged.

The system and method of the present invention is particularly intended for operation with computer networks constructed according to the ITU-T Recommendation H.323 for visual telephone systems and equipment for local area networks which provide a non-guaranteed quality of service. Recommendation H.323 is herein incorporated by reference in order to further describe the hardware requirements and operating protocols for such computer networks, and is hereinafter referred to as "H.323".

H.323 describes terminals, equipment and services for multimedia communication over Local Area Networks (LAN) which do not provide a guaranteed quality of service. Computer terminals and equipment which fulfill H.323 may carry real-time voice, data and video, or any combination, including videotelephony.

The LAN over which such terminals communicate can be a single segment or ring, or optionally can include multiple segments with complex topologies. These terminals are optionally integrated into computers or alternatively are implemented in stand-alone devices such as videotelephones. Support for voice data is required, while support for general data and video data are optional, but if supported, the ability to use a specified common mode of operation is required, so that all terminals supporting that particular media type can communicate. The H.323 Recommendation allows more than one channel of each type to be in use. Other Recommendations in the H.323-Series which are also incorporated by reference include H.225.0 packet and synchronization; H.245 control, H.261 and H.263 video codecs, G.711, G.722, G.728, G.729, and G.723 audio codecs, and the T.120-Series of multimedia communications protocols.

ITU-T Recommendation H.245.0 covers the definition of Media stream packetization and synchronization for visual telephone systems. ITU-T Recommendation H.245.0 defines the Control protocol for multimedia communications, and is hereinafter referred to as "H.245". H.245 is incorporated by reference as is fully set forth herein.

The logical channel signaling procedures of H.245 describes the content of each logical channel when the channel is opened. Procedures are provided for the communication of the functional capabilities of receivers and transmitters, so that transmissions are limited to information which can be decoded by the receivers, and so that receivers may request a particular desired mode from transmitters.

H.245 signaling is established between two endpoints: an endpoint and a multi-point controller, or an endpoint and a Gatekeeper. The endpoint establishes exactly one H.245 Control Channel for each call that the endpoint is participating in. The channel must then operate according to H.245. Support for multiple calls and hence for multiple H.245 Control Channels is possible.

The RAS signaling function uses H.225.0 messages to perform registration, admissions, bandwidth changes, status, and disengage procedures between endpoints and Gatekeepers. In LAN environments that do not have a Gatekeeper, the RAS Signaling Channel is not used. In LAN environments which contain a Gatekeeper, such that the LAN includes at least one Zone, the RAS Signaling Channel is opened between the endpoint and the Gatekeeper. The RAS Signaling Channel is opened prior to the establishment of any other channels between H.323 endpoints.

The call signaling function uses H.225.0 call signaling to establish a connection between two H.323 endpoints. The Call Signaling Channel is independent from the RAS Channel and the H.245 Control Channel. The Call Signaling Channel is opened prior to the establishment of the H.245 Channel and any other logical channels between H.323 endpoints. In systems that do not have a Gatekeeper, the Call Signaling Channel is opened between the two endpoints involved in the call. In systems which contain a Gatekeeper, the Call Signaling Channel is opened between the end point and the Gatekeeper, or between the endpoints themselves as chosen by the Gatekeeper.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention provides a system and a method for analyzing data packets on a computer network, for selec-

tively recording audio and video data packets, for organizing this stored information and for displaying the stored information upon request, such that communication sessions with computer network-based "telephone" systems can be logged.

The principles and operation of a method and a system according to the present invention may be better understood with reference to the drawings and the accompanying description.

Referring now to the drawings, FIG. **1** is a block diagram of an exemplary system for logging and displaying audio and/or visual data from communication sessions performed over a computer network. A computer logging system **10** features a user computer **12** connected to a communication session management unit **13**. Communication session management unit **13** is in turn connected to an intranet **14** through a network interface card (NIC) **16**.

User computer **12** includes a user interface **18**, which is preferably a GUI (graphical user interface), which is displayed on a display unit **20**. User interface **18** preferably enables the user to enter such information as the definition of the parties whose calls should to be monitored and/or logged, and which also preferably enables the user to enter at least one command for retrieving and displaying a communication session.

Display unit **20** is preferably a computer monitor. The user is able to interact with user computer **12** by entering data and commands through a data entry device **22**. Data entry device **22** preferably includes at least a keyboard or a pointing device such as a mouse, and more preferably includes both a keyboard and a pointing device. According to one preferred embodiment of the present invention, user computer **12** is a PC (personal computer). Alternatively and lpreferably, user computer **12** is a "thin client" such a net computer which is a computer able to communicate on an IP-based network. One example of such a net computer is the JavaStation™ (Sun Microsystems). The advantage of such net computers is that they allow the user to interact with complex, sophisticated software programs, yet generally do not have all of the powerful computing capabilities of currently available PC computers.

Intranet **14** could be a LAN or a WAN, for example. The connection between communication session management unit **13** and intranet **14** occurs through NIC **16**. NIC **16** is preferably any standard, off-the-shelf commercial product which enables communication session management unit **13** to be connected to any suitable computer network (for example, Etherlink II ISA/PCMCIA Adapter or Etherlink III PCI Bus-Master Adapter (3c590) of 3-Com™, or NE2000 Adapter of Novell™ or any other such suitable product). Examples of such suitable computer networks include, but are not limited to, any standard LAN such as Ethernet (IEEE Standard 802.3), Fast Ethernet (IEEE Standard 802.10), Token Ring (IEEE Standard 802.5) and FDDI.

All data packet traffic on intranet **14** is passed to a filtering module **24** through NIC **16**. As shown in more detail in FIG. **3** below, filtering module **24** screens the data packets in order to determine which data packets fulfill the following criteria. Briefly, the data packets should be IP packets with headers according to the H.225 and H.245 standards, indicating voice and/or video traffic. As noted previously, these standards define media stream packet construction and synchronization for visual telephone systems and the control protocol for multimedia communications.

Filtering module **24** then preferably passes substantially only those data packets which meet these criteria to a management module **28**. In the Zone Configuration of the system of the present invention, shown in FIG. **7** below, filtering module **24** preferably also transfers messages from other communication session management units.

Management module **28** receives the data packets passed through by filtering module **24**, and analyzes the received data packets. Optionally and preferably, a database **26** stores such information as the IP addresses of parties whose communication sessions should be logged, as well as the conversion table associating each party with at least one IP address, for example. The stored list of IP addresses representing those parties whose calls should be logged is preferably user-defined. As used herein, the term "party" refers to a person or persons communicating through a computer network-based telephone system. The latter preferred requirement significantly reduces the amount of data stored by including only data which is of interest to the user. Management module **28** analyzes and manages data in accordance with the applicable H.225 and H.245 specifications, including the H.245 control function, RAS signaling function and call signaling function, substantially as described above in the "Description of the Background Art" section.

Management module **28** analyzes the packets in order to determine the specific communication session to which the data packets belong, the type of data compression being used (if any), and whether the data packets were sent from an IP address which should be monitored. Management module **28** must perform this analysis since filtering module **24** simply passes all data packets which fulfill the criteria described briefly above (see FIGS. **3A–3D** for more detail). Since these packets are passed without regard to any of the information stored in database **26**, management module **28** must compare the rules of database **26** to the information present in the packet header of each packet in order to determine whether the received packet should be stored.

Those received packets which fulfill the rules of database **26** are then stored in a storage medium **30**, which is preferably a high capacity digital data storage device such as a hard disk magnetic storage device, an optical disk, a CD-ROM, a ZIP or DVD drive, or a DAT cassette, or a combination of such devices according to the operational needs of specific applications, or any other suitable storage media. Preferably, the specific communication session or "telephone call", with which each data packet is associated, is also stored in order for that session to be reconstructed and displayed at a later time.

Upon request by the user, management module **28** can then retrieve one or more data packets from storage medium **30** which are associated with one or more communication sessions. The retrieved packet or packets are then transferred to a data restore module **32**. Data restore module **32** is preferably capable of manipulating these retrieved packets to restore a particular communication session by using the RTP (Real Time Protocol). As described in further detail below with regard to FIGS. **4C** and **5**, in those systems which follow the RTP, the data packets are sent with a time stamp in the header rather than just a sequence number. Such a time stamp is necessary for audio and video stream data, in order for the data packets to be reassembled such that the overall timing of the stream of data is maintained. Without such a time stamp, the proper timing would not be maintained, and the audio or video streams could not be accurately reconstructed.

The communication sessions are restored from the reconstructed streams of data packets by using the applicable

audio and/or video CODEC's. A CODEC is a non-linear method for the conversion of analog and digital data. Thus, an audio CODEC enables the digitized audio data in relevant data packets to be converted to analog audio data for display to the user as audible sounds, for example. Suitable CODEC's are described in greater detail below with regard to FIG. **5**.

In order for the user to receive the display of the reconstructed communication session, system **10** preferably features an audio unit **34** and a video unit **36**, collectively referred to as a "communication session display unit". More preferably, both audio unit **34** and video unit **36** are capable of both receiving audio or video input, respectively, and of displaying audio or video output. At the very least, audio unit **34** and video unit **36** should be able to display audio or video output, respectively. For example, audio unit **34** could optionally include an microphone for input and a speaker or an earphone for output. Video unit **36** could optionally include a video monitor or display screen for output and a video camera for input, for example.

FIG. **2** is a schematic block diagram of system **10** of FIG. **1**, showing the overall system of software modules of system **10** in more detail. Reference is also made, where appropriate, to flow charts showing the operation of these software modules in more detail (FIGS. **3**A–**3**D and FIG. **5**), as well as to descriptions of the headers of the different types of data packets (FIGS. **4**A–**4**D).

As shown, system **10** again includes a connection to intranet **14** through NIC **16**. As the packets are transmitted through intranet **14**, NIC **16** intercepts these data packets and passes them to filtering module **24**.

Filtering module **24** has two components. A first filtering component **38** examines the header of the data packet, which should be an IP type packet with the correct header, as shown in FIG. **4**A below. Next, first filtering component **38** passes the data packet to a second filtering component **40**. Second filtering component **40** then determines the type of IP data packet, which could be constructed according to the H.225, H.245, RTP or RTCP standards.

As shown with reference to FIG. **3**A, first filtering component **38** and second filtering component **40** operate as follows. In step one, a packet is received by filtering module **24**. The packet is given to first filtering component **38**, which then determines whether the packet is an IP type packet in step two. Such a determination is performed according to the structure of the header of the data packet, an example of which is shown in FIG. **4**A. A header **42** is shown as a plurality of boxes, each of which represents a portion or "field" of the header. The number of bytes occupied by each portion is also shown, it being understood that each layer consists of 32 bits. The first portion of the header, a "VERS" portion **44**, is the protocol version number. Next, an "H. LEN" portion **46** indicates the number of 32-bit quantities in the header. A "SERVICE TYPE" portion **48** indicates whether the sender prefers the datagram to travel over a route with minimal delay or a route with maximal throughput. A "TOTAL LENGTH" portion **50** indicates the total number of octets in both the header and the data.

In the next layer, an "IDENTIFICATION" portion **52** identifies the packet itself. A "FLAGS" portion **54** indicates whether the datagram is a fragment or a complete datagram. A "FRAGMENT OFFSET" portion **56** species the location of this fragment in the original datagram, if the datagram is fragmented. In the next layer, a "TIME TO LIVE" portion **58** contains a positive integer between 1 and 255, which is progressively decremented at each route traveled. When the value becomes 0, the packet will no longer be passed and is returned to the sender. A "TYPE" portion **60** indicates the type of data being passed. A "HEADER CHECKSUM" portion **62** enables the integrity of the packet to be checked by comparing the actual checksum to the value recorded in portion **62**.

The next layer of header **42** contains the source IP address **64**, after which the following layer contains the destination IP address **66**. An optional IP OPTIONS portion **68** is present, after which there is padding (if necessary) and a data portion **70** of the packet containing the data begins.

The structure of the header of the data packet is examined by first filtering component **38** to determine whether this header has the necessary data fields in the correct order, such that the header of the data packet has a structure according to header **42**. First filtering component **38** only allows those packets with the correct header structure to pass, as shown in step **3**A. Otherwise, the packets are dumped as shown in step **3**B.

Those packets with the correct header, or "IP packets", are then passed to second filtering component **40**. Second filtering component **40** then performs the remainder of the filtering steps. In step **3**A, second filtering component **40** examines the IP packets to determine their type from the data portion of the packet as shown in FIG. **4**A. The packets could be in one of four categories: H.225, H.245, RTP and RTCP. The steps of the method for H.225 packets are shown in FIG. **3**A, while the procedures for the remaining packet types are shown in FIGS. **3**B–**3**D, respectively.

Once the type of the packet has been determined, both the packet itself and the information regarding the type of packet are both passed to management module **28**, as shown in FIG. **2**. The packet is then passed to the relevant component within management module **28**, also as shown in FIG. **2**, for the recording process to be performed. The recorded packets are stored in storage module **30**, as described in greater detail below with regard to FIGS. **3**C and **3**D.

If the packet has been determined to be an H.225 packet according to the header of the packet (see FIG. **4**B), the packet is passed to an H.225 call control module **78** within management module **28**, as shown in FIG. **2**. The steps of the management method are as follows, with reference to FIG. **3**A. In step **4**A of FIG. **3**A, the H.225 packet is examined to see if it is a setup packet, which is determined according to the structure of the data in the packet. This structure is specified in the H.225.0 recommendation, and includes at least the following types of information:

- protocolIdentifier (the version of H.225.0 which is supported);
- h245Address (specific transport address on which H.245 signaling is to be established by the calling endpoint or gatekeeper);
- sourceAddress (the H.323_ID's for the source);
- sourceInfo (contains an EndpointType to enable the party being called to determine whether the call includes a gateway or not); and
- destinationaddress (this is the address to which the endpoint wants to be connected).

Other types of data are also required, as specified in the H.225.0 Recommendation. This data structure enables H.225 call control module **78** to determine whether the packet is a setup packet.

If this packet is a setup packet, then the first branch of the method is followed. The source port is taken from a source

port field 74 of an H.225 header 72, and the destination port is taken from a destination port field 76 (see FIG. 4B). In step 5A, database 26 of FIG. 1 is then examined to determine whether either of the corresponding terminals is defined as a recording terminal; that is, whether communication sessions initiated by the IP address of this terminal should be monitored. If true, then in step 6A, the terminal status is set as a start session request from the terminal corresponding to the source port.

Alternatively, the packet is examined to see if it is a connect packet in step 4B, which is determined according to the structure of the data in the packet. This structure is specified in the H.225.0 recommendation, and includes at least the following types of information:

- protocolIdentifier (the version of H.225.0 which is supported);
- h245Address (specific transport address on which H.245 signaling is to be established by the calling endpoint or gatekeeper);
- destinationInfo (contains an EndpointType to enable the caller to determine whether the call includes a gateway or not); and
- conferenceID (contains a unique identifying number to identify the particular conference).

If the packet is a connect packet, then the second branch of the method is followed. In step 5B, the flag indicating the terminal status is examined to determine if the terminal status is set as a start session request. In step 6B, the details of the call signal are saved in a call progress database 78 of storage medium 30 (see FIG. 2). These details preferably include the source and destination IP addresses, the source and destination ports; the time at which the communication session was initiated, and any other relevant information. In step 7B, the status of the terminal is set to "wait for the logic channel".

If the packet has been determined to be an H.245 packet by second filtering component 40, the packet is passed to an H.245 call control module 82 within management module 28, as shown in FIG. 2. Such H.245 packets are necessary for H.245 signaling. H.245 signaling is established between two endpoints: an endpoint and a multi-point controller, or an endpoint and a Gatekeeper (see FIGS. 6 and 7 below for examples and a description of such endpoints). Each endpoint is capable of calling and of being called as part of a communication session. However, the system of the present invention only monitors, rather than initiating, such communication sessions. Thus, the system of the present invention uses the H.245 signaling to determine when the communication session has started in order to effectively record the necessary data packets for the storage and later reconstruction of the session.

The steps of the management method for H.245 packets are as follows, with reference to FIG. 3B. In step 1A of FIG. 3B, the H.245 packet is examined to determine if it is an open logical channel request packet. If it is, then in step 2A, the terminal status is examined to determine if the status is "wait for the logical channel". If so, then in step 3A the terminal status is set to "wait for acknowledgment".

Alternatively, the H.245 packet is examined to determine if it is an open logical channel acknowledgment packet, as shown in step 1B. If it is, then in step 2B, the terminal status is examined to determine if the status is "wait for acknowledgment". If so, then in step 3B the terminal status is set to "wait for terminal capability". In step 4B, the transport address of the "called" or destination terminal is saved. This transport address is taken from the destination port field 76 of header 72 (see FIG. 4B). It should be noted that H.225 and H.245 packets have identical header structures.

Also alternatively, the H.245 packet is examined to determine if it is a terminal capability set packet, as shown in step 1C. If it is, then in step 2C, the terminal capability is saved in call progress database 80 (see FIG. 2). In step 3C, the terminal status is set to "in call process", such that the communication session has been determined to be opened and such that management module 28 can now receive RTP data packets.

If the packet has been determined to be a RTP packet by second filtering component 40, the packet is passed to a RAS (registration, admissions and status) control module 84 within management module 28, as shown in FIG. 2. The steps of the management method for RTP packets are as follows, with reference to FIG. 3C. In step 1 of FIG. 3C, the terminal status is examined to see if it is "in call process". If so then in step 2, the RTP packets are saved in a RTP database 86 within storage medium 30 (see FIG. 2). FIG. 4C shows the structure of the RTP packet header, which can be used to identify the communication session from which the packet was taken.

Finally, if the packet has been determined to be a RTCP packet by second filtering component 40, the packet is passed to a RTCP control module 88 within management module 28, as shown in FIG. 2. The steps of the management method for RTCP packets are as follows, with reference to FIG. 3D. In step 1 of FIG. 3D, the terminal status is examined to see if it is "in call process". If so then in step 2, the RTCP packets are saved in call progress database 80 within storage medium 30 (see FIG. 2). FIG. 4D shows the structure of the RTCP packet header, which can be used to identify the communication session from which the packet was taken.

Thus, FIGS. 3A–3D illustrate the method of the present invention with regard to the filtering and storage of data packets which constitute the recorded communication session, as recorded by the system of the present invention as shown in FIGS. 1 and 2. Of course, in addition to recording such communication sessions, the system of the present invention is also able to retrieve and to replay these communication sessions to the user. The stored communication session, composed of stored data packets, can be retrieved and displayed by data restore unit 32 of FIG. 2, in conjunction with audio unit 34 and video unit 36. The method of retrieving and replaying sessions of interest is shown in FIG. 5, while certain other relevant portions of the system of the present invention are shown in FIG. 2.

In step 1 of FIG. 5, the user inputs the information concerning the communication session which is to be retrieved and replayed. This information preferably includes the terminal number, or other designation information concerning at least one of the parties of the communication session of interest; the time at which the session started; and the time at which the session ended. However, alternatively other information could be included in place of this information, as long as sufficient information is provided for the communication session of interest to be identified.

In step 2 of FIG. 5, call progress database 80 (see FIG. 2) is searched by data restore unit 32 in order to find the details of the communication session(s) in the specified time range. These details are then compared to the information entered by the user to locate at least one communication session of interest in the call range.

In step 3, RTP database 86 of storage medium 30 (see FIG. 2) is searched, again by data restore unit 32, to find substantially all data packets from the at least one communication session in the specified call range. Optionally and preferably, in step 4, if the audio portion communication

session was recorded in stereo, then the data packets are divided into different audio channels.

In step **5**, the data packets are restored by data restore unit **32** by an RTP (Real Time Protocol) software module **91** within data restore unit **32**. RTP software module **91** orders the data packets within each channel according to the time stamp of each packet. As shown in FIG. **4**C, an RTP packet header **92** features several important fields: a timestamp field **94**, a synchronization source (SSRC) identifiers field **96** and a contributing source (CSRC) identifiers field **98**. SSRC field **96** is used to determine the source of the RTP packets (the sender), which has a unique identifying address (the SSRC identifier). The CSRC identifier in CSRC field **98** is used in a conference with multiple parties, and indicates the SSRC identifier of all parties. Timestamp field **94** is used by RTP software module **91** to determine the relative time at which the data in each packet should be displayed.

For example, preferably the audio stream data of the audio speech of one person is synchronized to that person's lip movements as shown in the video stream, a process known as "lip synchronization". Such synchronization requires more than simply replaying audio and video data at certain relative time points, since the audio and video data packets may not arrive at the same time, and may therefore have slightly different timestamps.

Once the data packet has been correctly synchronized, the control of the display of the audio data is then performed by an audio component **102** of data restore unit **32** according to one or more audio CODEC's (see FIG. **2**). The control of the display of the video data is then performed by a video component **104** of data restore unit **32** according to one or more video CODEC's (see FIG. **2**).

Suitable CODEC's include, but are not limited to, an audio codec using CCITT Recommendation G.711(1988), Pulse Code Modulation (PCM) of voice frequencies; an audio codec using CCITT Recommendation G.722 (1988), 7 kHz audio-coding within 64 kbit/s; an audio codec using ITU-T Recommendation G.723.1 (1996), Speech coders: Dual rate speech coder for multimedia communications transmitting at 5.3. and 6.3 Kbps; an audio codec using CCITT Recommendation G.728 (1992), Coding of speech at 16 Kbps using low-delay code excited linear prediction; an audio codec using ITU-T Recommendation G.729 (1996), Coding of speech at 8 Kbps using conjugate structure algebraic code-excited linear-prediction (CS-ACELP); a video codec using ITU-T Recommendation H.261 (1993), Video codec for audiovisual services at px64 kbit/s; a video code using ITU-T Recommendation H.263 (1996), Video codingfor low bit rate communication; and substantially any other similar coding standard.

As shown in FIG. **2**, the audio data is displayed by audio unit **34**, which could include a loudspeaker, for example. The video data is displayed by video unit **36**, which could include a display monitor screen, for example. Step **5** of FIG. **5** is then preferably repeated, such that substantially the entirety of the communication session is displayed. As shown in step **6**, each data packet of the communication session is examined to see if the call time is over. If the individual session has not completed, preferably step **5** is repeated. Alternatively and preferably, if the call time is over, then call progress database **80** is searched to see if other communication sessions were recorded within the given time period, as shown in step **7**. If there is at least one other such communication session, then preferably the method of FIG. **5** is repeated, starting from step **2**.

According to preferred embodiments of the present invention, several configurations of the computer logging system are possible, examples of which are shown in FIGS. **6** and **7**.

According to a first embodiment of the system of the present invention, shown in FIG. **6**, a typical basic configuration system **104** includes a single communication session management unit **13**, substantially as shown in FIGS. **1** and **2**, according to the present invention. Communication session management unit **13** manages communication in a stand-alone intranet such as a LAN **106**. LAN **106** is connected both to communication session management unit **13** and to a plurality of terminals **108**, designated as "T1", "T2" and so forth, which follow the H.323 protocol. Each terminal **108** is an endpoint on LAN **106** which provides for real-time, two-way communications with another terminal **108**, a gateway **110**, or a multipoint control unit **112**. This communication consists of control, indications, audio streams, video streams, and/or data. Terminal **108** is optionally only capable of providing such communication for audio only, audio and data, audio and video, or audio, data and video. As noted previously in the "Description of the Background Art" section, the H.323 entity could be a terminal which is capable of providing audio and/or video communication as a "LAN telephone", but could also be a stand-alone audio or video telephone.

Gateway **110** (GW) is constructed according to H.323 and is an endpoint on LAN **106** which provides for real-time, two-way communications between terminals **108** on LAN **106** and other suitable terminals on a WAN (not shown), or to another such Gateway (not shown). Other suitable terminals include those complying with Recommendations H.310 (H.320 on B-ISDN), H.320 (ISDN), H.321 (ATM), H.322 (GQOS-LAN), H.324 (GSTN), H.324M (Mobile), and V.70 (DSVD).

Multipoint Control Unit (MCU) 112 is an endpoint on LAN **106** which enables three or more terminals **108** and gateways **110** to participate in a multipoint conference.

Preferably, system **104** also features a gatekeeper (GK) **114**, which is an H.323 entity on LAN **106** which provides address translation and controls access to LAN **106** for terminals **108**, gateways **110** and MCUs **112**. Gatekeeper **114** may also provide other services to terminals **108**, gateways **110** and MCUs **112** such as bandwidth management and locating gateways **110**. Preferably, gatekeeper **114** enables the IP address of terminals **108** on LAN **106** to be determined, such that the correct IP address can be determined "on the fly".

In addition, LAN **106** may support non audio visual devices for regular T.120 data applications such as electronic whiteboards, still image transfer, file exchange, database access, etc.

In basic system **104**, a single, stand-alone communication session management unit **13** is used for monitoring, logging and retrieval of all audio and/or visual calls either between any two or more terminals **108** attached to LAN **106** or any call to which one or more of these terminals **108** is a party. However, for the preferred embodiment of the system of FIG. **6** which includes gatekeeper **114**, as well as for the system of FIG. **7**, once the communication session has been opened, preferably RAS control module **84** also performs RAS signaling between the management control module and NIC **16** where necessary for the configuration of the system. Such signaling uses H.225.0 messages to perform regist ation issions, bandwidth changes, status, and disengage procedures between endpoints and gatekeepers. These messages are passed on a RAS Signaling Channel, which is independent from the Call Signaling Channel and the H.245 Control Channel. H.245 open logical channel procedures are not used to establish the RAS Signaling Channel. In LAN environments which contain a Gatekeeper (a Zone), the

RAS Signaling Channel is opened between the endpoint and the Gatekeeper. The RAS Signaling Channel is opened prior to the establishment of any other channels between H.323 endpoints.

FIG. **7** shows a second embodiment of the system of the present invention as a zone configuration system **116**. A zone **118** is the collection of all terminals (Tx) **108**, gateways (GW) **110**, and Multipoint Control Units (MCU) **112** managed by a single gatekeeper (GK) **114**. Zone **118** includes at least one terminal **108**, but does not necessarily include one or more gateways **110** or MCUs **112**. Zone **118** has only one gatekeeper **114** as shown. However, in the preferred embodiment shown, zone **118** is preferably independent of LAN topology and preferably includes multiple LAN segments **120** which are connected using routers (R) **122** as shown or other similar devices.

Each monitored LAN segment **120** has a local communication management unit **124** according to the present invention, of which two are shown. A central management unit **126** according to the present invention controls all local communication management units **124**. In addition to centralized database and control services, central management unit **126** can be used for the real-time monitoring and off-line restoration of audio and/or video communication sessions from a single point. Central management unit **126** is optionally and preferably either a dedicated unit similar in structure to local communication management units **124** but without the storage capability, or central management unit **126** is alternatively and preferably integrated with local communication management units **124** to provide the functionality of both local communication management unit **124** and central management unit **126** in a single station. Local communication management units **124** are preferably either communication management units **13** substantially as described in FIGS. **1** and **2**, or alternatively and preferably are simpler units which lack the capability to retrieve and display a communication session locally.

In still another preferred embodiment of the present invention (not shown), multi-user operation based on Client/Server architecture is preferably supported for basic system **104** and zone system **116**. An unlimited number of "Client" stations may be connected anywhere on the LAN, providing users with management and monitoring/retrieval capabilities determined by the authorization level of each specific user.

It will be appreciated that the above descriptions are intended only to serve as examples, and that many other embodiments are possible within the spirit and the scope of the present invention.

What is claimed is:

1. A system for managing a computer network-based telephone session over a computer network, the computer network being divided into a plurality of segments, the system comprising:

(a) a network connector for connecting to the computer network and for receiving data packets from a single segment of the computer network;

(b) a filtering unit for filtering said data packets from said single segment and for accepting said data packets substantially only if said data packets contain data selected from the group consisting of audio data and video data, such that said data packets form at least a part of the computer network-based telephone session and such that said data packets are selected data packets;

(c) a management unit for receiving said selected data packets from said single segment and for storing said selected data packets, such that said selected data packets are stored data packets, wherein said management unit and said filtering unit form a local management unit for said single segment of the computer network, said local management unit analyzing said selected data packets if the computer network-based telephone session occurs within said single segment;

(d) a storage medium for receiving and storing said stored data packets from said local management unit, such that at least a portion of the computer network-based telephone session is stored; and

(e) a central management unit for controlling each local management unit, said central management unit controlling storage in said storage medium and said central management unit analyzing said selected data packets from the computer network-based telephone session if the computer network-based telephone session includes data packets transmitted on a plurality of segments of the computer network.

2. The system of claim **1**, further comprising:

(f) a data restore unit for retrieving and displaying said at least a portion of the computer network-based telephone session, said data restore unit requesting said data packets from said storage medium through said central management unit, and said data restore unit reconstructing said data packets for displaying said at least a portion of the computer network-based telephone session.

3. The system of claim **2**, wherein said data restore unit further comprises a communication session display unit for displaying at least a portion of the computer network-based telephone session.

4. The system of claim **3**, wherein said communication session display unit is selected from the group consisting of a video unit and an audio unit.

5. The system of claim **2**, further comprising:

(g) a database connected to said filtering unit for storing filtering information, said filtering information including at least one IP address of a party whose computer network-based telephone sessions are monitored;

wherein said filtering unit accepts said data packets according to said filtering information, such that said filtering unit substantially only accepts said data packets if said data packets fulfill said filtering information.

6. The system of claim **5**, further comprising:

(g) a user computer for receiving at least one command of a user and for displaying information to said user, such that said user determines said filtering information according to said at least one command of said user.

7. The system of claim **6**, wherein the computer network is selected from the group consisting of a LAN (local area network) and a WAN (wide area network).

8. The system of claim **7**, wherein the computer network is a LAN (local area network).

9. The system of claim **1**, wherein said network connector is a network interface card.

10. A method for storing at least a portion of a computer network-based telephone session performed on a computer network, the computer network-based telephone session being performed between a packet source and a packet destination, the steps of the method being performed by a data processor, the method comprising the steps of:

(a) receiving a data packet from the packet source on the computer network;

(b) analyzing said data packet to determine if said data packet is a computer network-based telephone session packet;

(c) if said data packet is said computer network-based telephone session packet, filtering at least data in said data packet to determine if said data includes computer network-based telephone session data;

(d) if said data includes computer network-based telephone session data, analyzing said computer network-based telephone session data; and

(e)storing said computer network-based telephone session packet to form a stored packet according to said type, such that said stored data packet forms at least a portion of the computer network-based telephone session.

11. The method of claim **10**, wherein said data packet has a header and the step of analyzing said data packet in step (d) further comprises the step of:

(i) filtering said header of said data packet to retrieve header data related to the computer network-based telephone session.

12. The method of claim **11**, wherein substep (i) of step (d) further comprises the step of:

(1) analyzing said header data to determine if said data packet is an IP packet.

13. The method of claim **12**, wherein the step of analyzing said header data in substep (1) further comprises the steps of:

(i) examining said header of said IP packet to determine an IP address of said packet source;

(ii) determining if said IP address is a recorded IP address;

(iii) passing said IP packet to form a passed IP packet substantially only if said IP address is said recorded IP address; and

(iv) alternatively, dumping said IP packet.

14. The method of claim **13**, wherein the step of determining if said IP address is said recorded IP address is performed by comparing said IP address to a list of IP addresses from packet sources, such that if said IP address is included in said list, said IP address is said recorded IP address.

15. The method of claim **13**, wherein step (d) further comprises the steps of:

(ii) analyzing said IP packet to determine whether said passed IP packet is an H.225 packet, a H.245 packet, an RTP packet or an RTCP packet;

(iii) if said type of said passed IP packet is said H.225 packet, determining whether said H.225 packet is a setup packet or a connect packet;

(iv) if said H.225 packet is said setup packet, setting a status flag as "start session request";

(v) alternatively, if said H.225 packet is said connect packet and said status flag is "start session request", storing at least one detail of the computer network-based telephone session; and

(vi) setting said status flag as "wait for logic channel".

16. The method of claim **15**, wherein step (d) further comprises the steps of:

(vii) alternatively, if said type of said passed IP packet is said H.245 packet, determining whether H.245 packet is an open logical channel request packet, an open logical channel acknowledgment packet or a terminal capability set packet;

(viii) if said H.245 packet is said open logical channel request packet and said status flag is "wait for logic channel", setting said status flag as "wait for acknowledgment";

(xi) alternatively, if said H.245 packet is said open logical chanel acknowledgment packet and said status flag is "wait for acknowledgment", performing the steps of:

(A) setting said status flag as "wait for terminal capability"; and

(B) saving a transport address of the destination of the communication session; and

(xii) also alternatively, if said H.245 packet is said terminal capability set packet, performing the steps of:

(A) storing a capability of the packet destination from said terminal capability packet; and

(B) setting said status flag as "in call progress".

17. The method of claim **16**, wherein if said status flag is "in call process" and said type of said passed IP packet is said RTP packet, storing said RTP packet.

18. The method of claim **16**, wherein if said status flag is "in call process" and said type of said passed IP packet is said RTCP packet, storing said RTCP packet.

19. The method of claim **10**, further comprising the steps of:

(f) retrieving said stored data packet to form a retrieved data packet; and

(g) reconstructing at least a portion of the computer network-based telephone session according to said retrieved data packet.

20. The method of claim **19**, wherein the step of retrieving said data packet of step (f) includes the steps of:

(i) retrieving a source IP address of the packet source, a start time of the network-based telephone session, and an end time of the computer network-based telephone session; and

(ii) selecting at least one computer network-based telephone session according to said source IP address, said start time and said end time.

21. The method of claim **19**, wherein the step of reconstructing at least a portion of the computer network-based telephone session of step (g) includes displaying audio data.

22. The method of claim **19**, wherein the step of reconstructing at least a portion of the computer network-based telephone session of step (g) includes displaying video data.

23. The method of claim **19**, wherein the step of reconstructing at least a portion of the computer network-based telephone session of step (g) further comprises the steps of:

(i) receiving substantially only RTP packets;

(ii) examninng a header of said RTP packets to determine a time stamp for each of said RTP packets; and

(iii) displaying said RTP packets in order according to said time stamp.

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